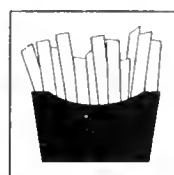
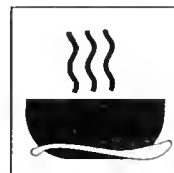
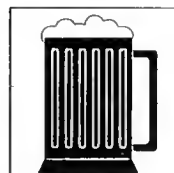
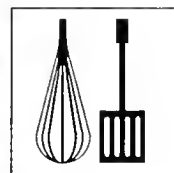


RESOURCE CONSERVATION

***GUIDE TO* Resource Conservation
and
Cost Savings Opportunities
in the
➔ Food Service Sector**



Guide to Resource Conservation and Cost Savings Opportunities in the ➔ Food Service Sector

March 1998

Prepared for:
Industry Conservation Branch
Ministry of the Environment

by:
RIS Limited
Engineering Interface Limited
Proctor & Redfern Limited

PIBS 3607



DISCLAIMER

Information presented in this guide is derived from publicly available sources. The views and ideas expressed in this guide are those of the authors and do not necessarily reflect the views and policies of the Ontario Ministry of the Environment. Mention of trade names, commercial products or supplier names do not constitute endorsements or recommendations for use by the Ministry. The Ministry encourages the distribution of information and strongly supports the concurrent promotion of resource conservation, pollution prevention and industrial competitiveness in Ontario. Resource conservation includes the efficient use of energy, water and other input raw materials, as well as the reduction of waste or residuals.

Similarly, the generic opportunities presented by the authors of this guide do not represent recommendations for implementation at specific sites. The authors of the guide are not responsible for any such implementation without prior consultation and further detailed site evaluation.

Any person who wishes to republish part or all of this report should apply for permission to do so to the
Ontario Ministry of Environment
Public Affairs and Communication Branch
135 St. Clair Ave. W., Toronto, Ontario, M4V 1P5, Canada

Copyright © 1998, Queen's Printer for Ontario
This publication may be reproduced for non-commercial purposes with appropriate attribution.

ACKNOWLEDGEMENTS

The development of this guide was jointly sponsored by the Ontario Ministry of the Environment (MOE), Industry Conservation Branch, and the Ontario Restaurant Association.

We wish to acknowledge the work and effort of the following organizations and private firms in providing valuable information, technical input and comments throughout the development of the guide. We are grateful to the members of the Steering Committee who made themselves available throughout the project:

- ¥ Paul Oliver, Lisa Jordan, and Rachelle Wood, Ontario Restaurant Association
- ¥ Don Copithorn, Consumers Gas
- ¥ Pamela Young, Ministry of Agriculture, Food and Rural Affairs
- ¥ Brian Van Opstal, Waste Reduction Branch, MOE
- ¥ Pamela Georgopolis, City of Toronto
- ¥ Simona Gasparetto, Industry Conservation Branch, MOE

The Steering Committee wishes to thank Maria Kelleher and Janet Robins of RIS Limited, Bob Bach of Engineering Interface Limited and Nancy Bonham and Kathy Taylor of Proctor and Redfern Limited for their skills and effort in preparing this document.

MOE and ORA encourage the distribution of this publication and strongly support the concurrent promotion of resource conservation, pollution prevention and commercial competitiveness through measures that include the conservation of resources such as energy and water, as well as the reduction of waste.

Dear Reader:

The Ontario Ministry of Environment and the Ontario Restaurant Association are pleased to provide this copy of the ***"Guide for Resource Conservation and Costs Savings Opportunities in the Foodservices Sector"***. The guide was prepared jointly by the Ministry and the Ontario Restaurant Association.

The guide identifies and promotes opportunities for conserving energy and water, as well as reducing waste, within the foodservices sector. By taking advantage of these opportunities, operators can lower their costs, while at the same time conserving valuable resources.

Many people have an interest in further improving environmental performance, including owners, managers and employees, suppliers, engineering designers and consultants. By combining your own knowledge and skills with the information contained in this guide, we can help keep the Ontario foodservices sector competitive by becoming more efficient and by conserving valuable resources.

We hope this guide is useful to you and your establishment. We would be grateful to receive any comments or questions you may have about this publication. You may contact the Ontario Restaurant Association by phone at (416) 359-0533 or 1-800-668-8906 or by fax at (416) 359-0531. You may also contact Simona Gasparetto at the Ministry of Environment at (416) 327-1484 or by fax at (416) 327-1261.



Daniel Cayen, Director
Industry Conservation Branch
Ministry of Environment



Paul Oliver, President
Ontario Restaurant Association

TABLE OF CONTENTS

	Page
Acknowledgements	
Executive Summary	
1.0 Introduction	1-1
1.1 Guidebook Structure	1-1
2.0 Sector Profile	2-1
2.1 Economic Status and Profit Levels	2-1
2.2 Number of Relevant Establishments and Market Characterization	2-2
2.3 Food Service Sector Business Costs	2-2
2.4 Relevant Legislation, Regulation and Standards	2-3
2.4.1 Energy Related Regulations	2-3
2.4.2 Water Related Regulations	2-4
2.4.3 Waste Related Regulations	2-5
2.5 Sector Survey and Site Visits	2-6
3.0 Resource Utilization and Sector Benchmarking	3-1
3.1 Energy Use	3-1
3.2 Water Use	3-1
3.3 Waste Generation	3-2
4.0 Resource Conservation Opportunities	4-1
4.1 Introduction	4-1
4.2 Employee Awareness & Public Relations	4-2
4.3 Commitment to a Resource Conservation Program	4-2
4.4 Employee Training on Resource Conservation	4-3
4.5 Energy Savings	4-3
4.6 Water Savings	4-6
4.7 Waste Management	4-10
4.8 An Integrated Approach	4-13
5.0 Quotations on Resource Conservation	5-1
5.1 General Quotes on the Food Service Sector and Resource Conservation	5-1
5.2 Quotations on Staff Commitment and Training	5-1
5.3 Quotations on Energy Conservation	5-2
5.4 Quotations on Water Conservation	5-3
5.5 Quotations on Waste Reduction	5-3
6.0 Other Helpful Information	6-1
7.0 References	7-1

APPENDICES

Appendix A	Resource Conservation Worksheets
Appendix B	Advisory Group Members
Appendix C	Site Visit Reports
Appendix D	Food Service Sector Resource Conservation Survey Questionnaire

LIST OF TABLES

		Page
2.1	Summary of Operating Profits for Food Service Establishments in Ontario (1995)	2-1
2.2	Number of Relevant Establishments and Market Characterization	2-2
2.3	Utility Expense as a Percentage of Total Operating Expenses in Ontario Food Service Establishments	2-2
2.4	Energy Requirements Under New Ontario Building Code	2-3
2.5	Regulations Relevant to Acceptable Indoor Air Quality in Ashrae Standard 62-1959	2-3
2.6	Ontario Building Code - Maximum Flow Rates for Water Supply Fittings	2-4
2.7	Ontario Building Code - Maximum Flush Cycles for Sanitary Fixtures	2-5
2.8	Summary of Available Cost Information from Food Service Survey Respondents	follows pg. 2-7
3.1	Energy Use in Restaurants by Activity	3-1
3.2	Water Use in Restaurants by Activity	3-2
4.1	Summary of Energy Conservation Options	4-5
4.2	Summary of Water Conservation Options	4-9
4.3	Summary of Waste Diversion Options	follows pg. 4-13

LIST OF FIGURES

		Page
2.1	Operating Costs and Profit as a Percent of Sales for Ontario Food Service Establishments	follows pg. 2-2
3.1	Food Service Sector Energy Consumption by Fuel Type	follows pg. 3-1
3.2	Energy Consumption by Equipment in Typical Food Service Operation	follows pg. 3-1
3.3	Energy Consumption by Function in Typical Food Service Outlet	follows pg. 3-1
3.4	End-Use Water Consumption for a Full Service Restaurant	follows pg. 3-2
3.5	Waste Composition in the Food Services Sector	follows pg. 3-2
3.6	Waste Composition in the Restaurant Sector	follows pg. 3-2
3.7	Waste Composition in the Fast Food Sector	follows pg. 3-2
3.8	Waste Composition in the Cafeteria Sector	follows pg. 3-2

EXECUTIVE SUMMARY

This study has shown that the food service sector is a significant one for the Ontario economy. In addition, the study has shown that there are many ways in which operating cost savings can be achieved by food service sector businesses through energy and water conservation and waste reduction. This message should be communicated to Ontario's 24,000 food service establishments, in order to contribute to resource conservation in Ontario, and also help increase business profitability.

Key facts about the food service sector in Ontario

- 24,000 food service locations
- Employs 260,000 people in Ontario
- Annual sales of \$10.3 billion in Ontario
- Annual growth rate of 4%
- Average profit levels of 9.3% of sales
- 65% of facilities have profit levels below 10%
- 15% of facilities have profit levels above 10%
- 20% of facilities run at a loss
- Largest costs are food and beverage purchases (33%), and labour (28%)
- Quick/counter service accounts for 40% of establishments, 23% are informal/family dining and 14% are pubs/taverns

Resource costs for the food service sector

- Utility costs vary from 2% to 8% of business costs
- Energy costs are largest of the utility costs, at 1.6% to 2.7% of business costs
- Water costs are a small business expense, at 0.2% to 0.35% of business costs
- Waste management is sometimes handled by the municipality, or is part of a lease agreement, at no cost to the food service operator
- Where waste management is contracted to a private company, it typically accounts for 0.3% to 0.6% of business costs

The most significant cost saving opportunities for food service operators are in energy conservation.

- Many food service establishments are constrained by existing buildings, and resource conservation options may be limited by the building configuration
- The best opportunity for energy conservation is in new facility design.
- For existing facilities, the following options should be explored:
 - changes to more energy efficient lighting
 - use low energy dishwashers
 - install high-efficiency water heater
 - frequent maintenance of refrigeration units and HVAC units
 - install kitchen heat recovery units
 - staff training on energy conserving practices
 - appropriate building insulation to lower HVAC costs
 - programmable thermostats

There are limited cost saving opportunities for water

- Water use by the food service industry is not significant, however, wasting hot water also increases energy costs, therefore limiting hot water use is most cost effective option
- Many water wasting situations can be fixed by staff training or frequent maintenance

Waste management cost savings can be significant if waste management services are contracted with a hauler

- Waste management costs are sometimes absorbed by the municipality, therefore the food service manager does not pay
- Where food service operators pay for their own waste management, there are a number of ways to save costs.
- Firstly, existing contracts should be reviewed, to ensure that bins are picked up only when full, this saves unnecessary pick-up costs
- Recycling cardboard can cut waste management costs by 20% to 30%, as it takes up a lot of space in garbage bins.
- Recycling cans and bottles will cut the amount of waste disposed by 20%, but may not impact significantly on waste management costs. It depends on how the hauler charges for recycling and garbage.
- On-site management of food wastes is only viable for a limited number of facilities. Where viable, it will cut the amount of waste disposed by 40% to 50%. The economics will depend on the cost of the composting unit. This option requires a small amount of staff time for proper maintenance, and an initial capital investment for the composting unit.
- Off site management of food scraps (as animal feed or in composting plants) reduces the amount of waste disposed by 40% to 50%. Some staff training is needed to properly separate food scraps in the kitchen. The economics depend on the contract arrangements, and vary from one location to another. This option should always be explored.

Facility Operator Needs

- Facility operators are extremely busy at all times, and do not have time to read much material
- The Ontario Restaurant Association is the most efficient way to disseminate information on resource conservation opportunities to food service operators in the province
- Site visits are also of interest to food service operators
- Attractive financing options would encourage food service operators to consider resource conservation options

1.0 INTRODUCTION

To remain profitable in today's competitive world, companies must optimize production efficiency. Companies now recognize the value in pollution prevention, not only as a means of complying with environmental regulations, but as a means to optimize the production process, conserve resources and save money.

Pollution prevention does not tackle one media at a time, such as air or water, but rather requires an integrated approach to effectively optimizing resource utilization and conservation. Energy, water and material consumption need to be understood at all stages of a business operation, in order to identify all the benefits of pollution prevention and minimize emissions to all environmental media (air, land, water).

The Industry Conservation Branch promotes resource conservation in industrial and commercial applications, recognizing that each commercial and industrial sector faces different challenges and opportunities in achieving effective resource conservation. This recognition has led to the development of a series of guidebooks aimed at promoting resource conservation and cost saving opportunities within different sectors.

The Resource Conservation and Cost Savings Guidebook for the Food Service Sector will enable food service establishments to assess their own operations using ready-made worksheets (presented in Appendix A) and will provide guidance on evaluating opportunities and new technologies and approaches to enhance energy and water conservation and minimize waste disposal, thus reducing operating costs.

An Advisory Group was established to provide assistance and direction throughout the project. The Advisory Group consisted of technical experts in the areas of energy, and water conservation and waste reduction who have applied their knowledge to the food service sector. The Ontario Restaurant Association was an active member of the Advisory Group, offering valuable insights about the challenges facing food service establishments. The list of Advisory Group members is provided in Appendix B.

Site visits were carried out by the consulting team at six food service facilities representing the range of food service businesses in operation in Ontario. The results of these six site visits helped to customize the guidebook to meet the needs of food service facility managers. Site visit reports are presented in Appendix C.

The advisory group recommended that relevant quotes from industry members be used where appropriate. These are included in Chapter 5 of the guidebook. Relevant quotes were considered to have more impact on food service managers than the case studies originally envisaged, therefore these are used in place of case studies.

1.1 GUIDEBOOK STRUCTURE

- Chapter 2 of the Guide describes the food service sector in Ontario, including a breakdown of typical expenditures. The results of the project survey and site visits are also summarized
- Chapter 3 presents benchmarks for energy and water use and waste generation by the Ontario food service sector.
- Chapter 4 presents options for resource conservation by the food service sector
- Chapter 5 presents quotations on resource conservation by food service sector operators
- Chapter 6 presents references used in the preparation of this guide.

Chapter 7 presents resources available.

The appendices to the Guide contain the following material:

- Appendix A contains worksheets for energy and water conservation, and for waste reduction.
- Appendix B contains a list of Advisory Group members
- Appendix C contains reports for the six site visits carried out as part of the project
- Appendix D contains a copy of the survey form used for the project

2.0 SECTOR PROFILE

2.1 ECONOMIC STATUS AND PROFIT LEVELS

The Canadian food service sector, contributes 3.7% to Canada's Gross Domestic Product and was responsible for 5.3% of total employment in 1994. It employs 667,000 people across Canada and 260,000 in Ontario alone. Annual sales for the food service sector in Ontario exceeded \$10.3 billion in 1995 (ORA, 1997).

The sector has a projected annual growth rate of 4% (Canadian Restaurant and Foodservice Association). Between 1985 and 1994 the number of food service establishments has grown by an average of 4.7% per year (Rahbar and Krsikapa, 1996).

Profit Levels

Up to a decade ago, owners and operators of food establishments could almost be guaranteed 20% return on investment. Today, however, the return on investment is generally less than 10% (KPMG, 1995). In Ontario, the average operating profit before income tax was 9.3% in 1995. Table 2.1 summarizes operating profit levels for the Ontario food-service sector (KPMG, 1995).

**TABLE 2.1
SUMMARY OF OPERATING PROFITS FOR FOOD SERVICE
ESTABLISHMENTS IN ONTARIO
(1995)**

Operating Profit or Loss	% of surveyed companies
0-10% profit	65%
Over 10% profit	15%
0-10% loss	17%
over 10% loss	3%
<i>Reference: KPMG, 1995</i>	

The profitability of a food service establishment increases over time, with the greatest insecurity occurring in the first five years of business. Approximately 62% of the food service establishments still in business have existed for over 6 years and 45% have existed for over 10 years (KPMG, 1995).

Ownership Structure

An estimated 71% of all food service establishments in Canada are independently owned and operated, with the remaining 29% owned and operated by large food service chains (Rahbar and Krsikapa, 1996). Most of the profits are concentrated in the large chains (ORA, 1997).

This situation has tended to cause the smaller, independent operations to place more emphasis on low initial capital outlays above other factors, with little consideration for resource conservation and pay-back opportunities.

2.2 NUMBER OF RELEVANT ESTABLISHMENTS AND MARKET CHARACTERIZATION

Ontario's food service industry has approximately 24,000 retail food outlets (Ontario Restaurant Association, 1997). Most of the food service establishments in Ontario are either informal/family dining restaurants (23%), quick/counter services (40.5%) or pub and taverns (13.8%). The breakdown of the sector by facility type is presented in Table 2.2.

TABLE 2.2
BREAKDOWN OF FOOD SERVICE ESTABLISHMENTS IN ONTARIO AND CANADA BY TYPE

	Ontario	Canada
Informal/family dining	23.0%	32.0%
Hotel/motel	3.2%	29.0%
Quick/counter service	40.5%	41.7%
Fine dining	4.2%	4.0%
Pub/tavern	13.8%	8.1%
Take-out/delivery	4.4%	1.8%
Institution	1.5%	0.7%
Contract foodservice	5.9%	6.8%
Other	3.5%	2.0%
<i>Reference: KPMG, 1995</i>		

2.3 FOOD SERVICE SECTOR BUSINESS COSTS

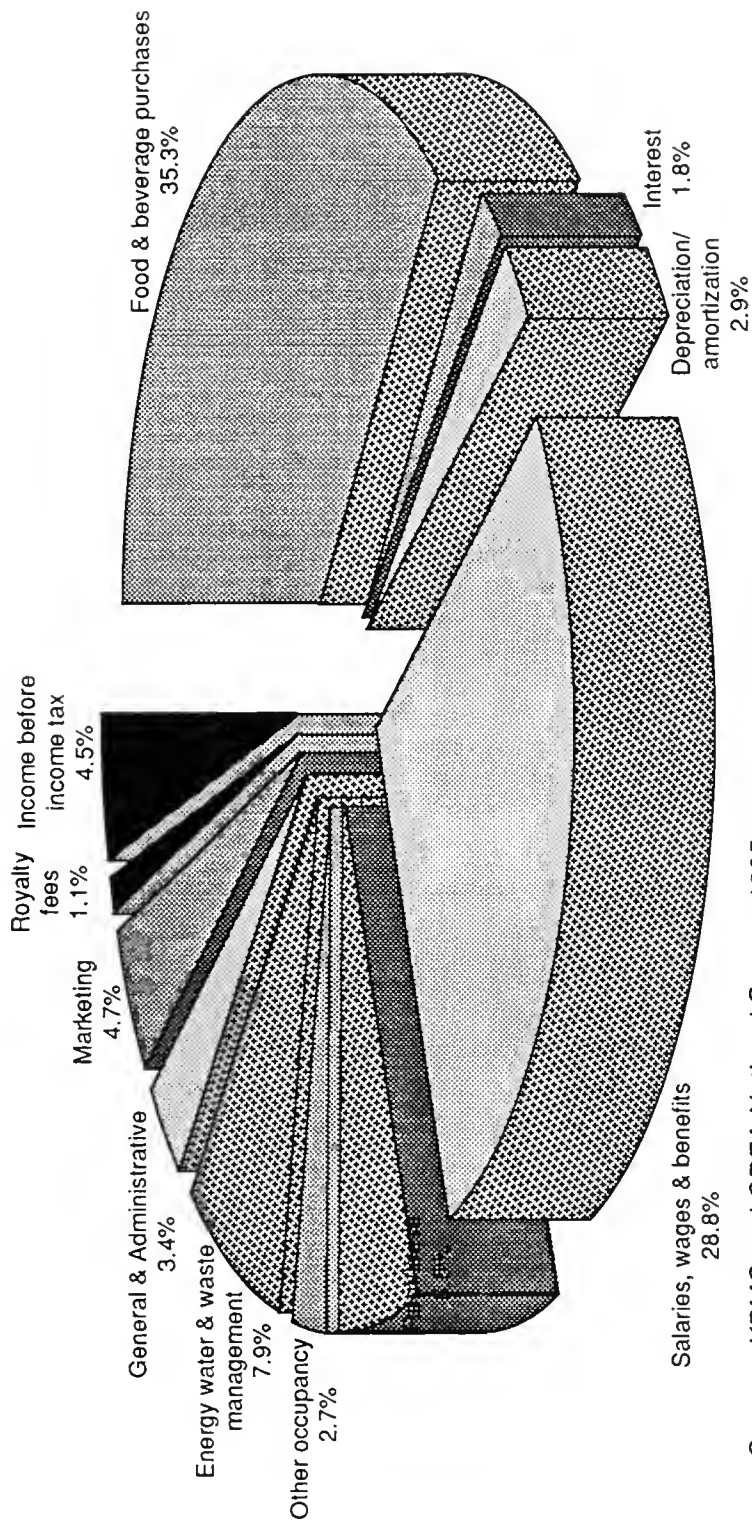
Figure 2.1 presents results of a survey conducted by KPMG for the Canadian Restaurant and Foodservice Association and indicates that the largest portion of the operating expenses for food service locations in Ontario is the cost of food and beverage purchases, which accounts for 35.3% of the total. Salaries/wages and benefits together represent an additional 28.8% of the total operating expenses. Utility costs and waste management costs account for up to 8% of total business costs for Ontario food service establishments (KPMG, 1995).

Utility costs (energy and water) were found to represent 2.2% to 6.4% of total operating expenses in Ontario establishments in another survey (Leibowitz, ORA 1996), whose results are presented in Table 2.3.

TABLE 2.3
UTILITY EXPENSE AS A PERCENTAGE OF TOTAL OPERATING EXPENSES IN ONTARIO FOOD SERVICE ESTABLISHMENTS

Type of Food Service Establishment	Utility Expense as a Percentage of Total Operating Expenses
Licensed Restaurants	3.1% to 6.4%
Unlicensed Restaurants	2.2% to 6.1%
Take-Out Food Services	3.2% to 6.0%
<i>Reference: Leibowitz, ORA, 1996</i>	

FIGURE 2.1
OPERATING COSTS AND PROFIT AS A PERCENT OF SALES FOR ONTARIO FOOD SERVICE ESTABLISHMENTS*



Source: KPMG and CRFA National Survey, 1995.

*Ontario data obtained from survey of 1,011 facilities in Ontario.

2.4 RELEVANT LEGISLATION, REGULATION AND STANDARDS

The following overview of the regulatory environment impacting the operations of food service establishments in Ontario is divided into the three categories: energy, water and waste.

2.4.1 ENERGY RELATED REGULATIONS

New Building Design

The Ontario Building Code requires that all new buildings be designed to be energy efficient in accordance with ASHRAE/IES Standard 90.1-1989, "Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings." This standard is summarized in Table 2.4 and sets forth criteria for energy efficiency in a number of areas.

TABLE 2.4
ENERGY REQUIREMENTS UNDER NEW ONTARIO BUILDING CODE

Electric Power	Minimum motor efficiencies, steps to allow metering of power consumption, examination of transformer losses
Lighting	Maximum allowable power for exterior and interior lighting, minimum ballast efficiencies
Other Systems & Equipment	Recommendations for refrigeration efficiencies
Building Envelope	Minimum performance standards for windows, insulation levels for walls, roof and foundation
Heating, Ventilation and Air Conditioning Systems and Equipment	Minimum equipment efficiencies, controls for energy conservation, efficient system design
Service Water Heating	Minimum equipment efficiencies, controls for energy conservation, efficient system design

Ventilation

ASHRAE Standard 62-1989, "Ventilation for Acceptable Indoor Air Quality" is cited in the Ontario Building Code as good engineering practice, and is widely accepted as the reference on this subject. This reference is under review at this time, but has not been revised to date. Recommended ventilation levels are presented in Table 2.5

TABLE 2.5
REGULATIONS RELEVANT TO ACCEPTABLE INDOOR AIR QUALITY IN
ASHRAE STANDARD 62-1959

Location	Recommend Ventilation Rate
Dining rooms or cafeteria	20 cfm/person (cubic feet per minute per person) (10 L/s/person)
Bars or cocktail lounges	30 cfm/person (plus supplementary smoke removal) (15 L/s/person)
Kitchens	15 cfm/person (plus makeup air for hood exhaust) (8 L/s/person)

Space Heating/Cooling

The efficiency of rooftop combination space heating and cooling equipment is determined by test standards developed and published by the Canadian Standards Association (CSA), and by the American Refrigeration Institute (ARI). The efficiency of hot water boilers and furnaces is determined by test standards developed and published by the Canadian Gas Association (CGA), and by the Gas Appliance Manufacturers Association (GAMA). Minimum efficiency levels for this equipment are regulated under the Ontario Energy Efficiency Act by the Ministry of the Environment and Energy.

Service Water Heating

The efficiency of service water heaters is determined by test standards developed and published by the Canadian Gas Association (CGA), and by the Gas Appliance Manufacturers Association (GAMA). Minimum efficiency levels for this equipment are regulated under the Ontario Energy Efficiency Act by the Ministry of the Environment and Energy.

Cooking Equipment

There are no mandated minimum efficiency standards for commercial cooking appliances in Canada. Performance test standards are under development to measure the efficiency of gas and electric cooking equipment and evaluate their overall performance. These are published by the American Society for Testing Materials (ASTM).

2.4.2 WATER RELATED REGULATIONS

The draft goal of the Province of Ontario is to hold water demand constant until the year 2011. The achievement of this goal will be accomplished by incorporating water efficient equipment and practices into domestic, industrial, commercial, institutional (ICI), and municipal action plans.

In support of the water efficiency objectives of the province, the provincial plumbing code has recently been revised to require water efficient fixtures for new construction. Tables 2.6 and 2.7 present maximum flow rates for new domestic type fixtures. The information is taken from the Ontario Building Code 1990, Section 7.6.4 (Water Efficiency).

TABLE 2.6
ONTARIO BUILDING CODE - MAXIMUM FLOW RATES FOR
WATER SUPPLY FITTINGS

Fitting	Maximum Flow	Test Pressure
	L/min (imp. gal/min)	kPa (psi)
Lavatory Faucet	8.35 (1.84)	413 (59.9)
Kitchen Faucet	8.35 (1.84)	413 (59.9)
Shower Heads	9.50* (2.09)	550 (79.8)
<i>Reference: Ontario Building Code 1990; Section 7.6.4; Water Efficiency</i> * Showerheads producing a flow rate below 8 L/min may be individually regulated by pressure or thermostatic compensating valves. ** Flows do not apply to existing fixtures or fixtures that exist in heritage buildings, institutions, or passenger stations.		

TABLE 2.7
ONTARIO BUILDING CODE - MAXIMUM FLUSH CYCLES FOR SANITARY
FIXTURES**

Fixture	until December 31, 1995 litres (imp. gal)	beginning January 1, 1996 litres (imp. gal)
Flush Tank Water Closet	13.25 (2.9)	6.0 (1.32)
Flush Valve Water Closet	13.25 (2.9)	6.0 (1.32)
Urinal (Tank Type)	5.68 (1.25)	3.8 (0.84)
Urinal (Flush Valve)	5.68 (1.25)	3.8 (0.84)
<i>Reference: Ontario Building Code 1990; Section 7.6.4; Water Efficiency</i> * Showerheads producing a flow rate below 8 L/min may be individually regulated by pressure or thermostatic compensating valves. ** Flows do not apply to existing fixtures or fixtures that exist in heritage buildings, institutions, or passenger stations.		

2.4.3 WASTE RELATED REGULATIONS

Ontario is the only province in Canada which has formally implemented legislation mandating solid waste audits for some commercial locations. In March 1994, the 3Rs Regulations were passed into law, requiring targeted IC&I sectors to conduct a waste audit and prepare a waste reduction workplan. Food service establishments subject to the regulation are as follows:

- All owners of restaurants, including take out restaurants, are designated and must implement a waste audit program if gross sales for all restaurants operated by the owner in Ontario were \$3 million or more in any of the two preceeding calendar years;
- For restaurants that were operational on March 3, 1994, when the regulation came into force, the sales must have been more than \$3 million in 1992 or 1993 for the regulation to apply;
- For restaurants which come into existence or increase above the sales criteria after March 3, 1994, the regulation will apply in the first calendar year following the calendar year in which gross sales were \$3 million or more.

Materials targetted for source separation and recycling in restaurants designated in the regulation include:

- Corrugated paper;
- Fine paper (office paper);
- Newspaper;
- Food and beverage containers made of aluminum, glass, steel or PET.

In order to remain in compliance, the audits and workplans must be updated on an annual basis and maintained on file at the restaurant location for five years. There is no requirement to submit the audit results to the Ministry of Environment and Energy (MOEE) but the MOEE may ask for copies of the workplan from targetted companies. The legislation is currently under review by the government of Ontario.

The municipality in which the food service establishment is located may impose landfill bans on designated materials that are considered easy to recycle, such as cardboard, wood waste and construction waste. The municipal recycling coordinator and waste hauler will know which materials are banned and are generally willing to work with staff to ensure that these materials stay out of the dumpster. It is not uncommon for municipal staff to

reject loads of waste or to double the tipping fee if loads with the banned materials are spotted. These costs will be passed on to the generator by the hauler.

2.5 SECTOR SURVEY AND SITE VISITS

A survey was carried out at the beginning of this project to collect information on the following topics:

- General information on companies surveyed (annual sales, staffing levels, floor area, etc.);
- Awareness of energy, water and waste related costs;
- Efforts to reduce energy, water and waste related costs;
- Awareness of options to improve resource conservation;
- Information needs to improve resource conservation.

A group of 30 companies were targetted for the survey. The list of survey recipients was developed in consultation with the Ontario Restaurant Association. Repeated efforts by both the study team members and ORA staff resulted in a 20% response rate to the survey.

Six site visits were carried out by the study team to test the effectiveness of the worksheets developed for the project

Information collected through the survey and the six site visits provided very useful and valuable insights to the study team on how the food service sector in Ontario operates on a day to day basis, and what communication methods are required to effectively engage this sector in resource conservation activities. This information will provide suggestions on how the contents of this resource conservation guidebook should be communicated to the 24,000 locations across the province who could use the information.

General observations from the site visits and survey responses are as follows:

- It is difficult to get complete data sets from food service operators. Some do not want to divulge information such as annual sales, others do not know what their energy, water or waste bills are, as these are paid by Head Office or the accounting department;
- Staff costs and food purchase costs are the largest expenses for food service managers. They are most concerned about keeping these costs under control, as they account for about 70% of operating costs (See Figure 1). By contract, energy and water costs account for 2% to 6% of their operating expenses, and are therefore a lower priority;
- Many food service managers do not pay for waste management, as this is either carried out by the municipality at no cost, or it is paid by the landlord in leased premises;
- Some food service managers do not pay for water or energy, this is handled by the Head Office or the accounting department, and does not directly impact on their responsibilities;
- Of the three issues addressed by the study (energy, water and waste), food service managers were most concerned about energy costs. Water costs did not appear to be a big concern. The level of interest in waste costs depended on whether the food service manager paid for waste management or not. Where they paid for waste management, they put more effort into recycling and diverting food scraps from disposal;
- Resource conservation efforts were considered if a short pay-back could be demonstrated, and if it did not interfere with their current operation or increase staff time;
- Food service managers were generally not aware of the requirement to carry out a waste audit and develop a waste reduction action plan if there were more than 10 staff members. Most facilities recycled the materials subject to the 3Rs

regulations, with the exception of office paper. Quantities of office paper generated by food service facilities are minimal, therefore this is often not recycled;

- When asked about how they would like to receive information on resource conservation options, most food service managers felt that the Ontario Restaurant Association was the best vehicle. Interest was also expressed in on-site visits and being provided with cost-benefit information;
- When asked about support needs, most indicated that attractive financing and information about products were their highest needs. Technical support was also of interest;
- Smaller, privately owned stand-alone food service establishments were the most motivated to look for savings in energy and water usage and in waste management costs, and were the most actively involved in the issue. The facilities in this category which were visited as part of the study had considered many of the resource conservation options presented to them.

Table 2.8 summarizes some of the survey and site visit information. It illustrates annual sales, staffing levels and energy, water and waste management costs for a select number of locations where a reasonable amount of information was provided. It is worth noting that only two of the seven locations in the table pay for waste management, or are aware of what it costs. Five of the seven are aware of energy costs, as these are a higher cost, and are generally paid by the food service manager. Four of the seven know what the water costs are.

The table illustrates that energy costs are by far the highest utility cost paid by food service facilities, but are still a relatively small cost compared to annual revenues. Of the four locations for which annual sales and energy cost data were available, energy costs were generally 1.3% to 2.3% of annual sales. Assuming that the four locations for which information was available ran at a 15% profit, energy costs would account for 1.6% to 2.7% of business costs for these four facilities.

Water costs, where available, were a considerably smaller expense, at 0.2% to 0.3% of annual sales, assumed to equate to 0.23% to 0.35% of business expenses.

Waste costs, where paid by the food service operator, were 1.2 to 1.8 times the water costs. This would extrapolate to a range of 0.28% to 0.63% of business expenses.

Chapter 3 of this guidebook presents benchmark data for water and energy usage and waste generation for the food service sector.

Chapter 4 presents options on how to conserve resources and also save money.

TABLE 2.8
SUMMARY OF AVAILABLE COST INFORMATION FROM FOOD SERVICE SURVEY
RESPONDENTS

Type of Facility	Annual Sales	Floor Area (Sq.m)	Staff	Annual Energy Costs	Annual Water Costs	Annual Waste Costs
Family Restaurant	\$2,080,000	935	35 FT 25 PT	Not known	Not known	Municipal pick-up
Fine Dining	\$1,070,000	280	28 FT 2 PT	\$19,300 Elec \$4,700 gas \$24,000	\$2,400	Municipal pick-up
Family Restaurant	\$1,700,000	590	26 FT 14 PT	\$21,600 Elec \$11,500 gas \$33,100	\$4,500	\$8,100 gar \$1,080 recyc \$9,180
Campus Contract Food Service	\$991,000	935	17 FT 7 PT	Paid by client	Paid by client	Paid by client
Family Restaurant	\$2,100,000	514	20 FT 20 PT	\$18,500 Elec \$8,400 gas \$26,900	\$6,600	\$7,800
Family Restaurant	\$5,000,000	813	80 FT 20 PT	\$51,000 Elec \$14,000 gas \$65,000	\$9,661	Municipal pick-up
Pub/Tavern	Confidential	514	13 FT 2 PT	\$10,000	Not provided	Municipal pick-up

3.0 RESOURCE UTILIZATION AND SECTOR BENCHMARKING

Chapter 2 described how much money is generally expended on energy, water and waste management by food service operators. This chapter briefly describes overall energy and water use by typical food service facilities, and where these resources are typically used. The amount and type of waste generated by these facilities is described, along with its composition. This benchmarking allows opportunities for resource conservation to be identified in subsequent sections of the guidebook.

3.1 ENERGY USE

Energy use by activity in food service locations is presented in Table 3.1.

**TABLE 3.1
ENERGY USE IN RESTAURANTS
BY ACTIVITY**

Activity	Percent of Energy Use
Space Heating	19.0%
Lighting	10.5%
Space Cooling	7.6%
Cooking	23.1%
Ventilation	5.0%
Refrigeration	6.3%
Water Heating	19.4%
Other	9.1%
Total	100%

The energy cost breakdown for a typical food service facility is approximately 25% for natural gas and 75% for electricity, as shown in Figure 3.1. Figure 3.2 presents the information shown in Table 3.1, which indicates that cooking equipment accounts for 23% of energy use, and water heating and space heating each account for 19% of energy use.

Figure 3.3 shows energy consumption by function. This figure shows that food preparation accounts for 35% of energy use, with HVAC accounting for an additional 28%.

Sector Benchmark

From the available data, the following benchmarks have been identified for energy use by food service establishments, expressed as a percentage of annual sales.

- 1.6% to 2.7% of business costs;
- Typically 75% electricity, 25% natural gas.

3.2 WATER USE

Water consumption varies widely across restaurants depending on a number of factors including: the type of service, the age of the water using equipment and the number of customers. The type of food service is a major factor since it relates to the type and amount of food preparation, whether disposable plates and flatware is used, and the amount of clean-up activity. The types of water use in food service facilities are summarized in Table 3.2. An estimate of the relative uses is provided in Figure 3.4. The major water uses are associated with food preparation, water-cooled refrigeration and ice machines, washrooms and dishwashing.

FIGURE 3.1
FOOD SERVICE SECTOR ENERGY CONSUMPTION BY FUEL
TYPE

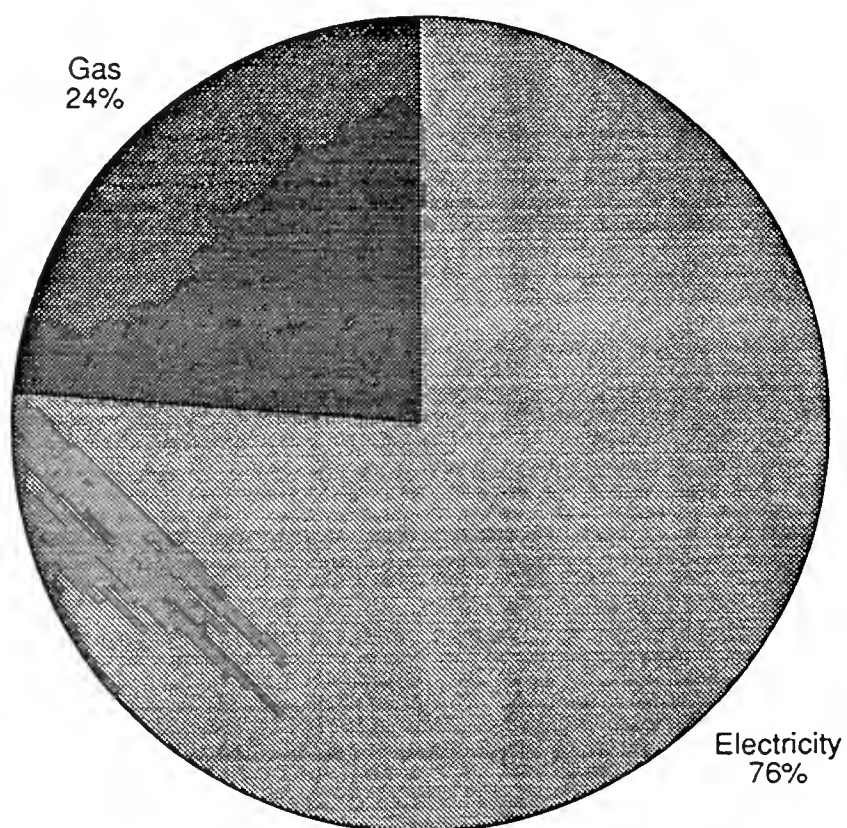


FIGURE 3.2
ENERGY CONSUMPTION BY EQUIPMENT
IN TYPICAL FOOD SERVICE OPERATION

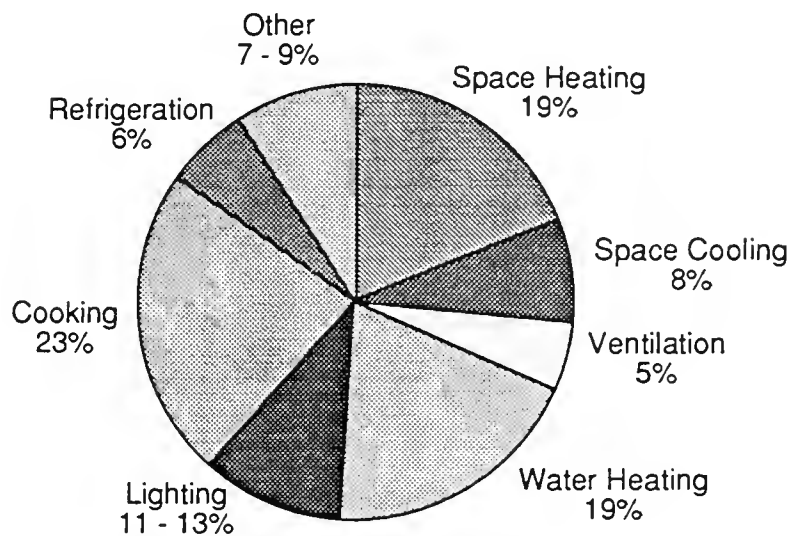


FIGURE 3.3
ENERGY CONSUMPTION BY FUNCTION IN
TYPICAL FOOD SERVICE OUTLET

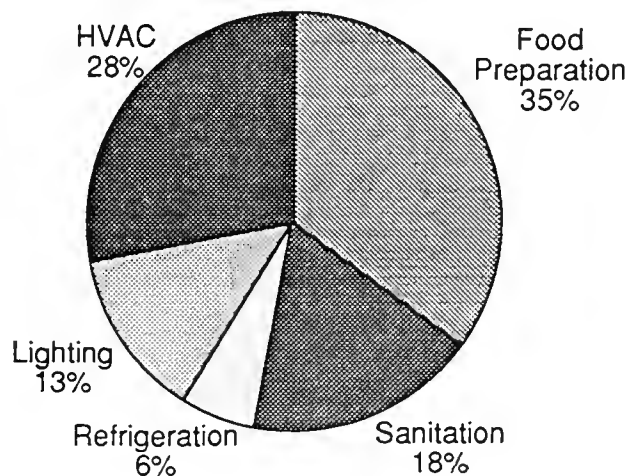
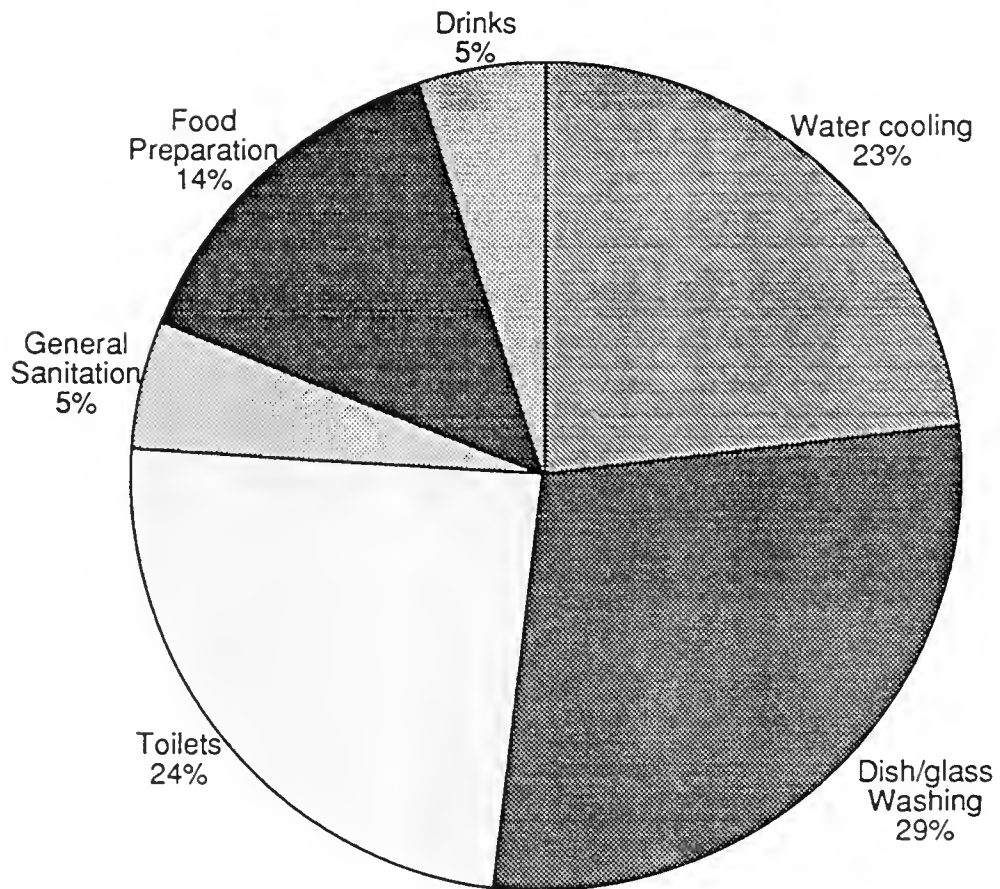


FIGURE 3.4
END-USE WATER CONSUMPTION FOR A FULL SERVICE
RESTAURANT



**TABLE 3.2
WATER USE IN RESTAURANTS
BY ACTIVITY**

Kitchens	<ul style="list-style-type: none"> • Refrigeration/freezer equipment • Commercial dishwashers, pre-wash sprayers • Plate cleaning troughs • Garbage disposers • Ice machines, ice cream/frozen yogurt machines • Food preparation
Heating and cooling	<ul style="list-style-type: none"> • cooling towers and evaporative condensers (large facilities) • once through water-cooled air conditioning systems
Domestic Uses	<ul style="list-style-type: none"> • toilets • sinks • urinals
Miscellaneous	<ul style="list-style-type: none"> • Cleaning/Maintenance • Water Conditioning • Landscaping

The following water benchmarks were developed based on information collected during site visits carried out for the study, a review of the literature, and survey results:

Water cost as a percent of sales: 0.20%

Water cost as a percentage of utility costs: 9.0%

3.3 WASTE GENERATION

Almost all of the waste generated by food service establishments is classified as solid, non-hazardous waste that does not require special management and disposal and can be sent to a local landfill.

A waste generation benchmark of 3.8 to 4.9 kilograms per day per employee before any waste diversion activity should be used for waste management planning.

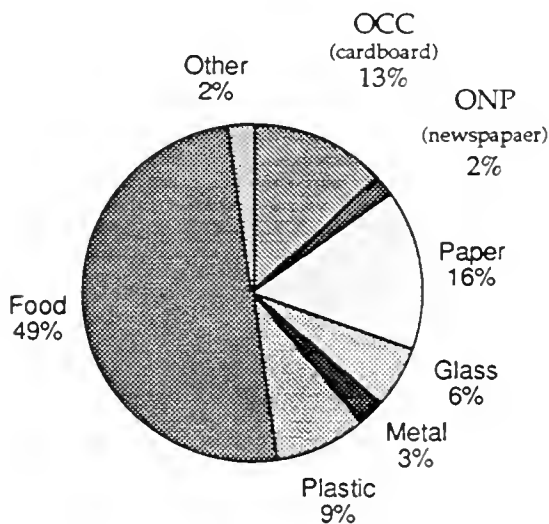
Over the course of a year, this amounts to 1.5 to 1.8 tonnes of waste generated per employee or 15 to 18 tonnes of waste per year for the average food service establishment in Ontario, which has 10 employees.

The typical waste stream of a food service establishment consists of the following components:

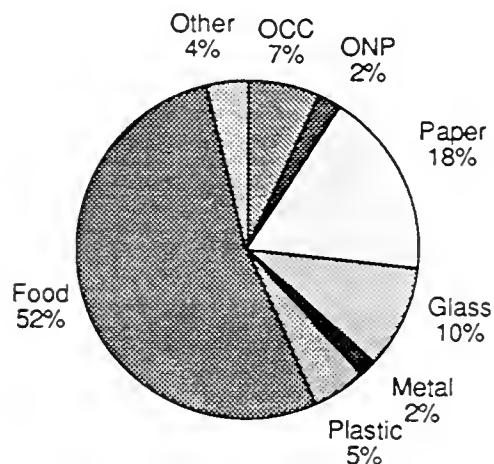
- Food scraps (up to 50%);
- Paper and cardboard waste (up to 30%) and;
- Recyclable containers (up to 20%).

The average composition of food service establishment waste from different composition studies is summarized in the pie chart in Figure 3.5. The different types of food service establishments will produce variations in waste composition as shown in Figures 3.6, 3.7, and 3.8 depending on the amount of food processed on site and the amount of food waste versus packaging waste produced in the front-end (where the customers eat) and the back-end (where the food is prepared) of the establishment.

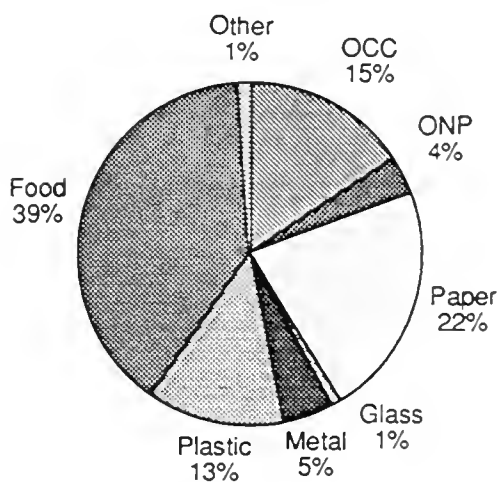
**FIGURE 3.5
WASTE COMPOSITION IN THE FOOD
SERVICES SECTOR**



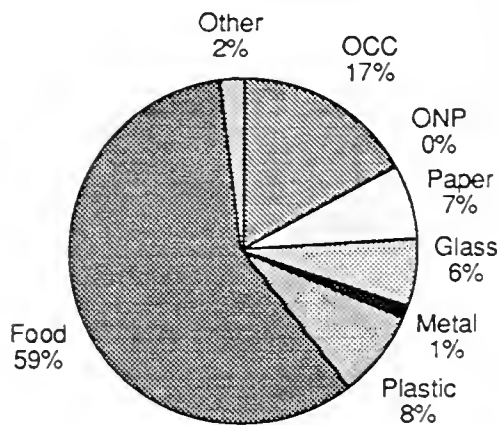
**FIGURE 3.6
WASTE COMPOSITION IN THE
RESTAURANT SECTOR**



**FIGURE 3.7
WASTE COMPOSITION IN THE FAST
FOOD SECTOR**



**FIGURE 3.8
WASTE COMPOSITION IN THE
CAFETERIA SECTOR**



4.0 RESOURCE CONSERVATION OPPORTUNITIES

4.1 INTRODUCTION

All business activities impact the environment but to varying degrees. Although companies may not think that they can correct global environmental problems, they can alter their own facilities to operate in a more environmentally-responsible manner. The challenge facing companies is to identify opportunities to promote resource conservation in a cost-effective manner and to ensure that the substitute activity does not just transfer the problem to another media.

The hierarchy of pollution prevention follows five simple principles (Westerman, 1993):

- Rethink - the way a company conducts its operations;
- Reduce - the product or activity with the ultimate goal of elimination;
- Reuse - the product or by-product as many times as possible;
- Recycle - the by-product after use to achieve further resource conservation;
- Results - see the results of an improved environment, employee pride, positive public relations, and cost savings.

Companies that have engaged in resource conservation activities have seen results. It has been proven that there is a positive correlation between undertaking environmental training programs and charity work and an increase in business (Foodservice & Hospitality, May 1996).

Owning and operating a food service establishment is considered a financially high risk business, since business is directly governed by the mood of the consumer and food market trends. Owners and operators of food service establishments recognize that the best way to improve the profit margin is to reduce operating expenses and improve the "bottom-line". Resource conservation initiatives offer some of the best opportunities to achieve "bottom-line" savings.

Resource conservation has many potential benefits for the food service industry (and any other business). It can:

- Save money;
- Improve efficiency;
- Help reduce expenditures on raw materials;
- Avoid legislative penalties and bad publicity;
- Increase employee morale and corporate pride;
- Reduce employee hazards;
- Enhance the corporate image by being seen as a good corporate citizen, which may in turn increase customer loyalty or attract new customers (this is especially true for the food service industry which is often perceived as a leader of the throwaway society).

Resource conservation initiatives can take the form of simple, low-cost improvements to intensive, high costs ones. The best approach should focus on the simple, low-cost improvements to boost employee awareness of the opportunities, minimize disruption to operations and show results. Further initiatives can build on these initial successes.

Because food service operations are so labour intensive, many resource conservation options focus on altering employee behaviour and attitudes to conserve resources where possible. This differs from other sectors where process and production changes or new technologies can result in large cost savings.

Appendix A contains worksheets which can easily be used by food service sector employees to assess their resource conservation performance and identify opportunities for improvement.

4.2 EMPLOYEE AWARENESS & PUBLIC RELATIONS

Employee awareness and involvement is critical to a successful resource conservation initiative in which staff become involved and share in the pride of a successful program. Although some resource conservation programs are top-down (i.e. imposed by management) and some are bottom-up (i.e. grassroots employee initiatives), the most successful programs tend to have both top-down and bottom-up elements.

A successful resource conservation program requires communicating with employees, to raise awareness of resource conservation issues and to motivate employees to participate in the program. Communicating with employees on this subject empowers employees with knowledge. The more knowledgeable employees are about resource conservation and how it relates to the foodservice industry and their job in particular, the more likely employees are to support resource conservation initiatives.

Involving staff in planning your resource conservation program is a good first step to ensure employee awareness. You may find it useful to plan or discuss some of the following with your employees:

- Relevant environmental issues and the scope of the problem;
- Resource conservation benefits to the environment and to the community;
- What the food service industry/restaurant might be able to do to reduce waste, water and energy consumption;
- How resource conservation relates to their (the employees') specific daily tasks;
- The ease of incorporating resource conservation measures into their current work requirements;
- The need for commitment from each employee;
- Where any revenues generated as a result of resource conservation will go, e.g. employee suggested charities, parties/picnics, etc.

4.3 COMMITMENT TO A RESOURCE CONSERVATION PROGRAM

Beyond awareness, a successful resource conservation program will secure cooperation and commitment from all employees. Some of the initiatives you can take with employees to keep interest high, develop pride and continued commitment are:

- Developing a position statement with employees regarding your company's commitment to improving and protecting the environment of your local community;
- Establishing short and long term resource conservation goals and timelines with employees;
- Seeking observations and suggestions of employees (e.g. regarding developing procedures for sorting and storage, identifying items that can be reduced/reused, etc.);
- Finding champions to generate enthusiasm for the program and to overcome inertia to change;
- Involving staff with waste audits so that they can see areas of opportunity;
- Sharing program successes regularly with employees;
- Commend employees on their specific resource conservation initiatives (e.g. Recycler of the Month Award).

In addition, there is some evidence that employees who sign formal statements committing to participation, tend to be more committed than those individuals who have not pledged their continued commitment to the program.

4.4 EMPLOYEE TRAINING ON RESOURCE CONSERVATION

Staff training is another key component to a successful resource conservation program. Employees need to be educated on the most efficient methods for minimizing the generation of waste, and to treat waste as a resource from which valuable components can be separated for processing or reuse. It will help employees to participate correctly in resource conservation initiatives if what is expected of them vis-à-vis the environment is specified in their job description, and is carried on through the job interview, job orientation, training and employee evaluation.

To summarize, an effective resource conservation training program will not only enlist the active participation of employees by raising their awareness of the environmental benefits of the program, but will also demonstrate management's interest in the program, and help each employee to understand the importance of their own resource conservation tasks, while stressing the ease of incorporating these tasks into their current work routine.

4.5 ENERGY SAVINGS

An organized and detailed approach to energy conservation can save approximately 20% of total energy costs in restaurants. Some of these cost savings can be achieved with only a minor change in operations. Other measures will require a change or addition to some equipment. Overall, a payback of 3 to 5 years can be achieved for a comprehensive energy conservation program in a typical food service operation. This is a critical issue for new restaurant owners, where there is a great uncertainty as to whether the business will survive 3 to 5 years.

Food service establishments may implement a series of energy conservation initiatives to reduce energy consumption and save costs. However, while it is important to consider how to save energy, it is equally important to consider the impact that activity has on other areas, such as health and safety, food safety and the environment. The four principles to follow when considering energy conservation (ARA, 1994) improvement are:

- Do not operate equipment if it is not needed;
- Reduce the heat or cold lost to the surroundings;
- Make all heat transfer is as efficient as possible;
- Reduce peak loading.

The following conservation initiatives can save energy and money.

Lighting

Current advances in lighting technologies have provided much more energy efficient lamps and ballasts which can be substituted for older types. Examples include:

- T12-40W Fluorescent lamps - replace with T8-32W lamps having better light quality and quantity*;
- Magnetic core and coil ballasts - replace with solid state electronic ballasts*;
- Incandescent light bulbs - replace with compact fluorescent lamps of lower wattage for energy savings, improved light quality and much longer life;
- Flood and reflector lamps - replace with quartz-halogen bulbs of lower wattage for energy savings, improved light quality and longer life;
- Exit lights - replace incandescent bulbs with LED type for energy savings and longer life.

*Note: these measures must be combined for maximum efficiency

HVAC

There are several measures which can reduce the energy required for heating and cooling the premises, without compromising comfort. These include:

- Expand economizer operation on rooftop unit. Balance point for restaurant is lower (about 13°C) than for other building types (about 18°C);
- Ensure fresh air is set to minimum during periods of low or zero occupancy
- Install energy efficient fan motor;
- Install programmable setback thermostat to set up/back temperature during periods of low or zero occupancy;
- Ensure complete maintenance on HVAC units at least twice per year;
- Turn off vestibule heaters in moderate weather;
- Balance kitchen makeup and exhaust air flows;
- Consider two speed operation of kitchen exhaust and makeup air fans.

Cooking

- Idle or shut down cooking appliance during slow periods where two or more identical appliances exist;
- Consider high efficiency gas-fired appliances such as radiant heating types when replacement is necessary or desirable.

Refrigeration

- Install occupancy sensors for lights in walk-in boxes;
- Install automatic door closers on all refrigerated boxes;
- Eliminate condensate heaters wherever possible;
- Maintain refrigeration equipment at least twice yearly;
- Install oversize condensers when replacement is necessary;
- Install hot gas heat recovery for service hot water.

Service Hot Water

- Maintain hot water temperature at minimum level allowed by regulations;
- Install high efficiency gas hot water heater when replacement is required;
- Consider heat pump hot water heater if electricity is the energy source;
- Install hot gas heat recovery for service hot water.

Table 4.1 summarizes the cost implications and other factors to be taken into consideration when assessing various energy conservation options.

TABLE 4.1
SUMMARY OF ENERGY CONSERVATION OPTIONS

Option	Costs Involved	Potential Cost Savings	Comments
Lighting			
Convert fluorescent lights to T8/ electronic ballast – 2 lamp fixture – 4 lamp fixture	\$55/fixture \$70/fixture	\$12/fixture/yr \$25/fixture/yr	Can often delamp to 2 lamps
Replace incandescent with compact fluorescent	\$17/lamp	\$21/lamp/yr	Assumes replacement on failure
Replace incandescent spot with quartz-halogen	\$1/lamp	\$20/lamp/yr	Assumes replacement on failure
Replace 20W Exit signs with 2W Exist signs	\$65/sign	\$12/sign/yr	Assumes replacing existing sign
Replace exterior mercury with high-pressure sodium	\$200/fixture	\$37/fixture	Assumes replacing existing fixture
Dining Area			
Recommission HVAC controls	varies	varies	1-2 year payback
Maintain HVAC systems	varies	varies	Savings can exceed maintenance cost
Kitchen			
Install low energy dishwasher	varies	varies	Reduced costs on water heating - lease programs available
Rebalance exhaust/makeup	varies	varies	Outdoor air to kitchen should only replace kitchen exhaust
Maintain refrigeration units	\$125/unit	varies	Clean condensers reduce heat rejection
Heat recovery on exhaust	\$4000/fan	varies	
General			
Install programmable thermostats	\$100/stat	varies	No savings for 24 hr operations
High efficiency water heater	Rental	varies	Limited savings for fast food
Insulate hot pipes & tanks	varies	varies	Less than 1 year payback
Retrofit windows	varies	varies	Long payback unless replacement is required
Insulate roof	varies	varies	3-5 year payback for 1 storey bldgs

4.6 WATER SAVINGS

Cities and municipalities recover the cost of providing water and wastewater services by billing for water consumption and incorporating a sewer surcharge into the water bill. Many communities in the province have already eliminated a declining block rate system, resulting in increased water costs for high volume users.

With a uniform rate system and a 100% sewer surcharge, for every dollar of water you save through water efficiency measures, you save \$2 on your water bill. By reducing your water use, you not only save on your water bill, but you may also reduce your energy and cleaning detergent consumption.

Demand side planning means trying to do more with less. Demand side management is a useful tool that can be applied to all types of resource uses. Although most people are inherently familiar with this concept, most people are not prepared to reduce their time spent in the shower or the number of baths they may take. A preferred solution is to improve the operational efficiency of the processes involved. For example, replacing a once-through cooling system for a condenser with a closed loop system can reduce water demand by 98 - 100% while not compromising the effectiveness of the system.

Another incentive to reduce water usage is the hidden cost of heating hot water. Typically the cost of water (including sewer surcharge) is relatively inexpensive, around \$1/m³. However, the cost to heat the hot water using an electric water heater is around \$5/m³ and using natural gas the cost is around \$1.50/m³. Once the cost of heating the water is included, the unit cost of hot water is around \$6/m³ for facilities using electric water heaters \$2.50/m³ for facilities with natural gas water heaters.

Domestic Water Efficiency Opportunities

At least a small number of domestic style water fixtures (toilets, showers, faucets) can be found at almost all restaurants. Some opportunities for reducing water use include:

- **Faucets:** Install flow restricting aerators or replace with a metering faucet (self closing after several seconds). Electronic motion detection faucets are not generally cost-effective unless installed in areas of extremely high usage;
- **Hoses:** A hose running unattended can have a flow of 30 litres/minute (approximately \$25 -\$50 per day). All hoses should be equipped with a trigger nozzle to permit better control of the spray pattern and prevent the water being wasted when the hose is unattended by an operator;
- **Toilets** can be adjusted to use less water per flush, or they can be replaced with water efficient models;
- Toilet retrofit kits can improve the efficiency of older, high-volume flush toilets by reducing the flush volume by anywhere from 2 to 5 litres/flush. These products are only recommended for tank-type toilets. They are inexpensive (approximately \$20/toilet) and are relatively easy to install. Care must be taken to ensure that the toilet will continue to operate properly; an adjustable type device should be purchased so that the product can be adjusted to the characteristics of your particular toilet;
- Replacing existing non-efficient units with ultra-low flow (ULF) water closets will save 7 to 13 litres per flush. Pressure-assist or vacuum-assist type ULF toilets are generally recommended for restaurants. Gravity-type ULF toilets should be avoided due to their tendency to flush inadequately and plug relatively frequently;
- Flush-valve type toilets can be adjusted to provide more or less water per flush. Water pressure, bowl design, and downstream conditions can all affect the performance of a water closet; the flush valve should be adjusted, if possible, to use the minimum volume of water while providing a good quality flush. Although there is no hard and fast way of determining the efficiency of flush valves, a simple rule is, "Unless the valve is using obviously too much

flow, let it go". Adjusting the flow usually requires only the use of a screw driver or wrench and takes only a few minutes. Alternatively, the flush-valve can be replaced with a water efficient model.

Approximately 1/3 of toilets have leaking flapper valves that can easily waste 500 litres per day. Drop a dye tablet or liquid food dye into the toilet tank. After approximately 15 minutes inspect the water in the bowl - the presence of colour indicates a leaking flapper. Flappers cost only about \$3.00 and are easy to change.

Heating and Cooling (HVAC) and Refrigeration

Reduce the water used in your once-through cooled air conditioning and refrigeration equipment by implementing one or more of the following options:

- Replace the water cooled system with an air-cooled systems for air conditioning, ice machines, coolers, or freezers;
- Reuse the cooling water to cool or heat other equipment before discharging it to the sewer, or use it as process water in another operation. The heat energy in the cooling water can be transferred through a heat exchanger to other equipment, such as a pre-heater for water entering a water heater or boiler. The discharged cooling water can also be used for washing floors and equipment, or watering the landscape;
- The flow of cooling water should be controlled by a valve. Solenoid valves are not dependent upon a human operator and automatically control the flow of cooling water and limit it to periods of equipment operation. Solenoid valves generally cost approximately \$100 - \$200 installed.

Kitchen Uses

Almost 40% of a restaurant's total water use is in the kitchen. Large facilities' kitchens use a tremendous amount of water to keep food cool and/or frozen, prepare meals, and wash dishes. Keeping equipment operating in top condition, eliminating unnecessary flows, and implementing efficient kitchen practices all reduce water use. The following are methods to lower the volume of water associated with restaurant kitchens:

Commercial dishwashers, pre-wash sprayers: water flows for commercial dishwashers range from 9 to 30 litres per minute. Measures which can lower water use include:

- Wash only full loads of dishes;
- Dishwasher rinse water can often be used for low-grade purposes such as in the garbage disposal;
- Have service personnel periodically check dish washing equipment to ensure that it is functioning properly, i.e., ensure that the flow of water in conveyor-type machines operates only when the dishes are actually passing through the dishwasher;
- Use manual pre-wash sprayers, which are more water efficient than automatic systems. With an automatic system, consider changing the spray heads to reduced-flow models or install a flow reduction valve in the water supply line;
- New dishwashers should be the water recirculating type that recirculate the final rinse water to the first rinse or wash;
- Ice machines use water to make the ice, for continuous bleed-off or batch dump of process water to remove the dissolved contaminants (in ice cube makers) and as cooling water for some machines. A typical water cooled ice cube maker uses up to 15 litres of water for every kilogram of ice produced. Air cooled ice-flake or nugget machines use much less, approximately 2.5 litres of water for every kilogram of ice. Flake or nugget machines also use less water than air-cooled cube units, which typically use 3.3 litres of water per kilogram of ice.

- Replace your water cooled ice cream machine or yogurt machine with an air cooled system. This will save 8-12 litres per minute (5.7 m³ for every eight hours of operation);
- Use conveyor type plate cleaning troughs instead of scraping types; this will save between 15 - 40 litres per minute;
- Garbage disposers:
 - Ensure that the flow of garbage disposal water stops when the motor stops;
 - Consider using wastewater from the dishwasher in the mixing chamber of the garbage disposer;
 - If practical, eliminate the use of garbage disposals. Use garbage strainers instead and reduce your water use by 12-24 litres per minute.
- When replacing existing or installing new water using fixtures, machines, or processes, ensure that they meet the highest available standards for water and energy efficiency;
- Implementation of water efficient practices and equipment maintenance can have a significant impact on water use. In many restaurants faucets are left running, water valves are stuck open, and inefficient practices are used in food preparation (such as using running water to defrost food):
 - Install electronic or foot-operated faucets to eliminate unattended operation;
 - Eliminate thawing of food with running water; thaw food under running water instead of the refrigerator, reduce flows to no more than 2 litres per minute;
 - Ensure that there are no leaks in the steam or water lines.

Research has identified that the most cost-effective opportunities for water conservation in restaurants are the retrofit of water-cooled condensers on ice machines, the use of water efficient fixtures in the kitchen, including foot valves, the use of water efficient valves for toilets and urinals, regularly scheduled maintenance for dishwashers and valves on water cooled condensers, and the promotion of water-efficiency in the design stage of a restaurant.

An estimate of the potential costs and savings associated with various water conservation measures is presented in Table 4.2.

TABLE 4.2
SUMMARY OF WATER CONSERVATION OPTIONS

Option	Costs Involved	Potential Cost Savings	Comments
Install Faucet Aerator	\$2	\$41-69 a year, based on tap being on 20 min/day	Reduce flow by 50% (5.7-9.5 l/min)
Install Metering Faucet	low cost - varies with faucet	\$45-82 a year, based on tap being on 20 min/day	Reduce flow by 60% (6.2-11.3 l/min)
Install Electronic Motion Detector Faucet			Only cost effective in high usage applications
Repair Leaking Faucets	<\$1	A small leak can cost \$30/year A large leak costs in the range of \$100-150/year	Replacement of washer usually corrects the problem
Retrofit Older Toilets to Reduce Flow	\$20/toilet	2-5 litre/flush (0.1-0.5¢/flush) \$7.3-36.5/year, based on 20 flushes/day	Relatively easy to install
Install Ultra-low Flow Toilet		\$51-95/year, based on 20 flushes/day	7-13 litres/flush (0.7-1.3¢/flush)
Adjust Flush-Valve type Toilet	\$0	varies	Adjusting the flow requires a screw driver or wrench and only takes a few minutes
Check for Leaking Flapper Valves in Toilet	\$3/flapper	up to 500 litres/day (\$182/year)	Easy to check for leaks using food dye and flappers are easy to change
Replace Water Cooled Systems with Air Cooled air conditioning, ice machines, coolers or Freezers	Prices between air and water cooled systems are comparable	An water cooled ice machine uses 8 times the amount of water as an air cooled machine	Equipment details should be reviewed to ensure the increased electrical costs do not exceed the water savings
Reuse Once-Through Cooling Water	\$0	varies	Potential uses include the garbage disposal
Install Valve to Control Cooling Water Flow		varies	
Wash Only Full Dishwasher Loads	\$0	6.5 litres/rack (5 less racks a day saves \$70/year)	

TABLE 4.2 (CONT'D)

Option	Costs Involved	Potential Cost Savings	Comments
Reuse Dishwasher Rinse Water	\$0	varies	Potential use in garbage disposal or other low grade requirements
Service Dishwashers Regularly	-	varies	Maintenance required to ensure water shut-off functions correctly
Use Manual Pre-Wash Sprayers	-	varies	
Purchase New Dishwashers that recirculate the Water	-	50% reduction in water use	Newer machines reuse final rinse water in wash cycle and pre-rinse
Use Flake Ice Machines instead of Cubers	-	<div style="border-bottom: 1px solid black; display: inline-block; padding: 2px;">\$0.60/100 lb ice (water cooled)</div> \$0.25/100 lb ice (air cooled)	Use flakes where their quality is acceptable. Utility costs of flakers are about half those of cubers
Use Conveyor Type Plate Cleaning Troughs	-	varies	
Ensure the Garbage Disposal Flow of water Stops when the Motor stops	\$0	varies	
Reuse Water from other sources in the Garbage Disposal	\$0	varies	
Eliminate the Use of Garbage Disposals	\$0+	varies	If garbage removal is included in Municipal taxes then there is no increased cost.
Purchase fixtures, machines that are water and energy Efficient	-	New dishwashing equipment is on the market that can reduce water usage by 50% and energy usage by 16%	Utility costs should be considered in any new equipment purchases
Institute a Program to ensure Efficient use of water	-	Up to 10% reduction	

4.7 WASTE MANAGEMENT

Restaurants engage in waste reduction and recycling programs for two reasons: to improve customer relations and to save money. Since food service operations are so closely tied with consumer attitudes and behaviours, many restaurants see a marketing advantage to becoming "greener". Waste reduction ultimately contributes to bottom-line savings.

There are a number of opportunities for waste diversion in the food service sector but not necessarily financially realistic. An estimated 75% of the restaurant waste stream can be

reduced and diverted, resulting in a 50-60% reduction in waste hauling charges (Buchanan, 1992). This goal can be accomplished but will require extensive planning and modification of operations. A diversion rate of up to 25% diversion can be achieved without any food waste diversion, and between 50% to 75% can be achieved, with a food waste diversion program in place.

The opportunities for waste diversion in a food service operation are numerous but not all are necessarily financially realistic. At least 25% of the waste can be reduced or diverted through simple, inexpensive, process modification coupled with proper employee training. As the level of success for the simple initiatives becomes apparent, there may be further opportunities to introduce new diversion initiatives.

The following conservation activities can reduce and divert waste and save money:

Waste and Packaging Reduction

- Work with your supplier to introduce returnable transport packaging or to take back shipping boxes for recycling. Some of the more common reusable shipping containers includes egg crates, bun and bread trays and milk cartons. In addition, new collapsible plastic containers are available to replace cardboard cartons;
- Ask your supplier on a regular basis what new innovations have been introduced to reduce packaging;
- Work with your supplier to reduce the size and weight of take-out packaging and to see if they can help implement a recycling program in your facility for the packaging waste (e.g. polystyrene packaging, polycoat packaging - such as milk cartons and paper coffee cups, stretch film, etc.);
- Programs are offered throughout Ontario to recycle polystyrene, polycoat and stretch film. It may not be economically feasible to recycle these materials at an individual food service establishment, however, suppliers may offer the program as part of a value added service to their customers;
- Food service establishments located in office buildings, malls or institutional settings may be able to work with the property managers and other businesses to collectively recycle packaging waste;
- Purchase supplies in bulk but take into consideration the life span of a perishable item which may be better purchased on an as-needed basis;
- Replace creamers and milkettes with dispensers and insulated milk jugs - cream dispensers can realize cost savings of 40% after the payback period;
- Replace individual portions of condiments (mustard, ketchup, relish, salt, pepper and sugar) with bulk dispensers. This will help the environment by reducing single serving packaging waste and will also save money.

Recycling

- Food service establishments can call their local recycling coordinator to identify any recycling opportunities and/or equipment available to them free of charge and should invite the recycling coordinator to visit their facility to assess recycling opportunities and to help work out storage space challenges;
- Some food establishments suffer from a lack of storage space for recycling carts inside and outside their building. This may be overcome by working with the local recycling coordinator or sharing carts with neighbouring businesses that have storage outside;

- Food service establishments which receive private collection can approach their waste hauler to see if a recycling program can be established at no cost or at a reduced rate - some haulers will conduct waste audits as part of their service;
- Ontario 3Rs legislation requires some food service establishments (\$3 million or more annual sales) to recycle cardboard, fine paper, newspaper and food/beverage containers made of glass, steel, aluminum, or PET;
- During periods of high market value for cardboard, some businesses can work with recycling companies to receive payment for their cardboard or have other materials collected for no additional charge;
- Collect used fats, oils or grease from grease traps for recycling;
- Place clearly marked recycling bins in heavy traffic areas, such as by the food preparation area in the back and in the dining area in the front - it is a good idea to locate garbage containers along with recycling containers to reduce contamination;
- Donate empty buckets or pails (that cannot be taken back by the supplier) to schools, nurseries or churches or give them away to employees or use them for recycling bins.

Diverting Food Waste

- Although some municipalities permit the use of garburators (garbage disposers) to grind food waste and then wash it down the sink, more and more municipalities are introducing by-laws eliminating their use;
- Garburators use high amounts of water and add additional loads on the wastewater treatment plants due to the high BOD (biological oxygen demand) of the discharged effluents;
- A traditional method for diverting food waste is to send it to pig farmers. This saves money, as the farmer usually picks up the food waste at no charge.
 - make sure that the pig farmer has been certified to receive food waste;
 - pig farmers will identify appropriate food wastes for their pigs and favour food with variety and not high in coffee grounds and orange peels;
 - some food waste has been known to end up on the farmers fields. This should be discussed with the pig farmer especially if this raises concerns.
- Unserved meals and other edible left-over foods can be sent to a local food bank, or church involved in an "out of the cold" program that feeds the needy. A call to the local volunteer centre, library, or town hall should help locate places which can use the left over food;
- On-site composting - involves the implementation of a composting program on the property and may involve the following composting methods:
 - in-vessel composting systems - an enclosed compost system to reduce odours;
 - backyard composters.It is applicable only in particular circumstances, but should be explored as an option.
- Off-site composting - the food waste is sent off-site to a composting facility which may use the following composting methods
 - in-vessel composting systems - an enclosed compost system to reduce odours;
 - open windrow system - exposed piles of organic waste which must be turned often to encourage decomposition of the organic material and also

- requires a balance of leaf & yard material (high carbon content) with grass & food waste (high nitrogen content) to minimize odours;
- enclosed composting systems - a blend of the in-vessel and windrow approaches.
- Explore the off-site composting options available in your area. They may be cheaper than waste disposal, and it may be economically worthwhile;
- Vermicomposting involves the use of worms to transform food waste into a soil conditioner
 - equipment is available to vermicompost on-site or some companies offer vermicomposting off-site;
 - worms cannot handle contamination by paper waste and other non-food waste and do not have a high tolerance for coffee grounds and orange peels.

Health and safety concerns and requirements can deter some waste reduction initiatives, such as composting food waste generated by customers. These and other potential problems need to be considered when planning a waste diversion program. Often the problem can be overcome by modifying the program. For example, many food service establishments have chosen to divert only those food wastes from the "back of the house", where the food is prepared.

The potential cost savings from various waste reduction measures are presented in Table 4.3.

4.8 AN INTEGRATED APPROACH

Sometimes a resource conservation option actually saves in one area, but increases resource utilization in another. Here are a few examples:

Putting Food Waste in Garburators vs Putting Food Waste in the Garbage:
Where allowed, the use of garburators can significantly decrease the amount of food waste in garbage. However, these are not recommended from a resource conservation point of view for the following reasons:

- They use additional water and energy;
- They put an increased load on the downstream municipal wastewater treatment plant;
- putting food waste in a garburator is an inefficient way to handle this waste stream.

High Temperature Ware-washers vs. Low Temperature Ware-washers:

With chemical sanitation, a chlorine-based disinfecting agent is added to the final rinse water, which reaches only 140°F (60°C). The lower temperature of this water is one of the primary attractions of the low temperature machines. This reduces energy costs associated with the dish washing cycle, but increases the chemical costs slightly since the dishes must be disinfected chemically. In addition, if the relative humidity in the dish room becomes too high, it is difficult to air dry the dishes, even with the use of rinse aids. Some potential problems with low temperature units include water spots and grease left on plates and cups. (Temperatures below 130°F (54°C) will not remove tallow fat).

Low temperature dish machines are also coming under the scrutinizing eyes of environmentalists, because of the issue of disposing of large amounts of chemicals, which are required by low temperature warewashers, down the drain and into the waste stream.

TABLE 4.3
SUMMARY OF WASTE DIVERSION OPTIONS

Waste Management Option	Costs Involved	Potential Cost Savings	Comments
Use reusable rather than disposable dishware	Depends on size of restaurant - purchase costs for dishware and silverware - on-going replacement costs - additional water and energy usage to wash rather than dispose	Some reduction in waste management costs. Large savings in on-going disposable dishware purchase costs	Applicable to sit-down rather than take-out locations. Each location needs to address economics, depending on packaging purchase costs, etc.
Change supplier packaging	No costs to food service operator	Some savings in waste disposal costs	
Investigate using reusable containers with suppliers	No costs to food service operator	Some savings in waste disposal costs	Storage of containers may be an issue
Set up cardboard recycling program	Maybe no costs, depending on hauling contract-contractor may provide bins	Up to 30% savings in waste disposal costs because: - bins fill up more slowly (bulky cardboard has been removed) - recycling cost for cardboard lower than waste management because of material revenues	Requires additional bins for cardboard, some minor staff time to flatten cardboard. Results in fewer garbage pick-ups. Staff should flatten OCC to reduce volume
Set up can and bottle recycling program	May be no costs, depending on hauling contract-contractor may provide bins	May not affect waste management costs, this will depend on contract structure	Will require additional bins for recycling, minimal staff time involved
Send suitable food waste to Food Bank or Food Agency	May be no cost as agencies may pick-up	Up to 20% savings in disposal costs, as less pick-ups required	Will require separate handling and management of some food waste
Use food scraps as animal feed	Bin purchase may be required, or hauler/farmer may supply bins at no cost	Save over 40% in waste disposal costs-less pick ups required. There may be cost for pick-up of food scraps - in some areas, farmers pick-up at no cost. This varies throughout province	Need to make sure food scraps go to licenced farm
On-site composting or vermicomposting	Purchase cost for on-site system (\$3,000 to \$20,000 depending on size). Purchase costs for bins (@ \$90/bin)	Save over 40% in waste disposal costs. One Ottawa-area restaurant saves \$3,600 per year	Not feasible at all facilities. Need suitable location for composter, staff committed to proper management (to avoid odours). Need source separation in separate bins in kitchen and front of house
Off-site composting of food scraps	Depends on contract structure - composting may cost the same or less than disposal - check with contractor	Savings depend on structure of garbage contract. About 40% less waste to dispose - there may be waste disposal savings, but composting will also cost	Need staff training and separate bins for food waste Need storage space in freezer or refrigerator unless pick-up is frequent

One of the main benefits of the chemical disinfection process is that it requires a minimal up front payment, as most low temperature machines are leased and not sold. Additionally, it does not necessitate the added expense of a booster heater.

To properly disinfect dishes with low temperature dishwashers, a minimum of 50 parts per million of chlorine must come in contact with the surface of the dishes. The wash/rinse cycle of most low temperature dish machines runs for about 90 seconds.

High temperature disinfection raises the temperature of the final rinse water to 180°F (82.2°C) with a booster heater, killing all forms of bacteria. Higher temperature rinsing also offers the benefit of a faster drying time.

The above two examples illustrate the importance of checking if your resource conservation approach increases utilization of resources in other areas, and assessing the trade-offs before a final decision is made.

5.0 QUOTATIONS ON RESOURCE CONSERVATION

This chapter presents quotations and facts on resource conservation in the food service sector. The information is presented in this way to allow industry members to use the quotations in newsletters, speeches, etc.

5.1 GENERAL QUOTES ON THE FOOD SERVICE SECTOR AND RESOURCE CONSERVATION

Planning For Long Term Energy Savings

"For around three quarters of the food service owners in Canada the selection of cooking equipment is made based on the lowest first costs, irrespective of energy efficiency and operating costs. This mentality can be explained by the volatility of the commercial food service market place. The independents have no guarantee of being in business sufficiently long to worry about lifecycles costs of the equipment." (Rahbar and Krsikapa, 1996).

Resource Conservation Saves Money

If a food service establishment achieves 10% profit, it would require increased food sales of \$20,000 to make \$2,000 profit. The equivalent \$2,000 saving in operation costs could possibly be achieved more easily through energy, water and waste conservation measures.

Ontario Lodge Wins Environmental Award

Barryvale Lodge, located in the Ottawa Valley, won the Financial Post's 1995 Award for Excellence in Environmental Management. Over the years the Lodge has achieved a 10% reduction in annual Hydro costs and a propane reduction of 20%. In addition, the Lodge has diverted 50% of its garbage from landfill through recycling and composting efforts. "What is pleasing is that these savings were achieved during a period in which there was an overall 15% increase in business". (Foodservice and Hospitality, Dec 1995).

5.2 QUOTATIONS ON STAFF COMMITMENT AND TRAINING

Program Driven by Staff

It's really easy! People are already reducing and recycling at home. When we started recycling a few materials here, I was pressured by my staff to do more! They kept asking me when we were going to start recycling other materials like phone books, newspapers, etc. Once people started, there was no stopping them. We've had a tremendous amount of support from our employees (Facility Manager, Bombardier).

The Red Lobster Encourages Staff Training to Make Recycling Successful

The Red Lobster in Guelph recognized the importance of training staff on how to properly participate in its recycling program. As a result staff attitudes about recycling have been so positive and the recycling program so successful that elements of it are being copied by other Red Lobster restaurants. The Guelph restaurant has also adopted a part of the local river and conducts cleanups twice a year and helps maintain the trout breeding areas in the river. (Foodservice & Hospitality, July 1993).

5.3 QUOTATIONS ON ENERGY CONSERVATION

Energy Conservation Saves Money

A project carried out for two fast food restaurants identified the potential for 20% savings in annual utility bills (two-thirds savings in HVAC-related bills and one-third savings in lighting bills). The environmental benefit of reduced demand for electricity and gas also resulted in a cost saving of almost \$15,000 annually. (Engineering Interface, 1996)

Energy Conservation Makes Sense

The prime motivating force behind the decision to establish an effective energy conservation program is the foodservice manager's realization that energy conserved is drastically cheaper than energy purchased. (Unklesbay, 1982).

1. *From a fast food service operator:*
"When we renovated our premises, we converted all our fluorescent lighting to the latest T8 lamps with electronic ballasts. This change has saved us over half our electricity costs for lighting."
2. *From a fine dining restaurant owner*
"I am very conscious of operating expenses. I have a relative who is an electrician, and he has installed energy efficient lighting throughout our premises. This has provided a noticeable reduction in our electricity costs, and in most cases has improved the effect of the colours in our decor."
3. *From the owner of a bar/restaurant*
"I found the most important component of our electricity cost was for heating hot water for washing dishes. I had the local gas utility install direct vent mid-efficiency water heaters, which has saved a considerable amount on my utility costs."
4. *From the manager of a family restaurant*
"We used to leave all the interior lights on 24 hours per day, even though we received direct sunlight through a full length solarium on the west wall. By instructing staff to turn off the interior lights when they weren't needed, we were able to show significant savings on electricity."
5. *From the owner of a family restaurant*
"Due to restrictions related to our location, we couldn't heat our hot water by natural gas, so we had to stay with electricity. By converting our dishwasher to a lower temperature chemical rinse type, we were able to lower our electricity bill by over 20%".
6. *From the owner of a fast food outlet*
"When we renovated our premises, we separated the heating and cooling for the dining area from the kitchen by having separate systems installed. This change, along with the addition of "smart" controls and careful scheduling of the system operation, has made a significant improvement in our costs for gas and electricity."
7. *From the owner of a fine dining restaurant*
"We had occupancy sensors installed in the storage areas, washrooms and the walk-in cold storage areas. This has reduced our energy costs and extended light bulb life."

McDonalds Saves Money

McDonald's, Oak Brook, Ill., became an Environmental Protection Agency Green Lights Program partner a year ago and will realize an average 30% savings in its lighting bills system wide. Green Lights involves replacing T12 Fluorescents (and magnetic ballast's)

with energy-efficient T8s (and solid-state electronic ballasts). The T8s not only save energy, but the light they provide is much more flattering to food and complexion. Replacing the lights cost about \$3,000 to \$4,000 per McDonald's unit, says Bob Langert, director of environmental affairs. But many utility companies offer rebates for the switch, up to \$1,000 per restaurant, and the lights save 7 to 8 cents per kilowatt hour. "The food-service industry needs to know about this program," he says. "It's a winner."

5.4 QUOTATIONS ON WATER CONSERVATION

Water Conservation at Grenadier Restaurant

The water conservation potential of a restaurant varies dramatically, depending on the type of food service establishment, and the type and age of the equipment used. The Grenadier Restaurant in the City of Toronto reduced their water use by over 60% by eliminating their once-through cooling systems, with a payback of less than 3 years. (Proctor & Redfern, 1996)

Water Conservation Saves Money

In one UC-Santa Barbara dining hall, the garbage disposal required 8 gallons of water a minute, but was using up to 15 gallons because employees were letting it run too long. For the cost of \$50 for parts plus labor, Ed Johnson, the environmental manager installed a 3-minute timer on the controller and water usage dropped to a fraction of what it had been.

At the same time, tons of water was needed to recharge foodservices' water-softening system. But Johnson realized that only the dish machines really required softened water. So he attached individual water softening canisters to the hot and cold lines of the dish machines and dismantled the overall softening system. Salt content in softened water is a problem for water reclamation and, prior to reducing his softened water use, Johnson couldn't take advantage of the reclamation process. Considering that reclaimed water costs him 91 cents per 100 cubic food and fresh water costs close to \$4, this was a disadvantage, to say the least. Now, he can use reclaimed water for all campus irrigation.

This action, combined with the disposal timer, cuts the department's water usage in half, to 9,000 gallons a day from 18,000. In all, the campus saves \$225,000 in water costs yearly.

5.5 QUOTATIONS ON WASTE REDUCTION

Movenpick Reduces Packaging and Saves Money

Movenpick's four restaurants worked with food suppliers to reduce packaging sent for disposal. For example, salad ingredients are now packaged in plastic wrap and delivered in cardboard boxes that could be reused or recycled. Consequently, Movenpicks total garbage pick-ups at the four restaurants has reduced from 1 tonne per day to 100-150 kilos per day, resulting in \$150,000 savings per year. (Foodservice and Hospitality, July 1992).

Composting Program Involving Food Retail Chains

Kingston Ontario worked with CRFA and several food chain operations (McDonalds, Wendys, Harvey, Pizza Hut, Tim Hortons, Burger King, KFC and Swiss Chalet) to test a composting pilot program involving a centralized composting facility operated by Correctional Services Canada. While the set-up costs were high, the program diverted 30% of their garbage (the food waste). This has resulted in an average 25% saving on waste hauling charges.

QUOTATIONS ON RESOURCE CONSERVATION

"The program is doing the job for us. We're spending about half of what we were spending on waste disposal before we started separating organics"(Pizza Hut owner). (Biocycle, June 1995)

Finding the Right Hauler Saves Money

At Glastonbury (Conn.) Public Schools, Director of Foodservice Brad Devlin agreed to his hauler's \$900 a month extra charge for picking up recyclables. But when the hauler refused to reduce the size of the regular garbage bins and the pickup schedule, which would lower regular garbage-hauling costs, Devlin found a hauler 30 miles away who would work with him and gave him the bid. Devlin says it's mandatory to create competition when haulers don't cooperate.

Recycling Cardboard Saves Money

Studies show that corrugated cardboard comprises at least a third of the garbage generated by foodservices. Operators report that garbage -hauling costs have dropped by as much as 50% when they began to separate out cardboard because they can switch to smaller garbage receptacles and reduce the number of garbage pickups each week.

At UC-Santa Barbara, Ed Johnson says garbage -hauling costs dropped by 50% when his staff began breaking down boxes and storing them separately for pickup. He pays his hauler \$10 a ton to take it away. But when Johnson receives the \$12,000 baler he ordered, the hauler will pay him \$20 a ton for the baled cardboard.

Diverting Polystyrene Saves Money

For the past two years, Christopher's Bakery Cafe, located in a 32-story office building in Philadelphia, has cut garbage bills in half by recycling foam and cardboard.

Owner Martin Tjiattas started the program with the help of his polystyrene-container supplier. Using a densifier leased from the supplier for about \$300 a month, Tjiattas can crush a load of 8,000 containers into a 15-inch-long by 15-inch-diameter cylinder that weighs about 40 pounds. Every 10 weeks, the supplier picks up the cylinders.

What makes the example even greener is that Tjiattas has involved his customers in his recycling efforts. "We know that about three-fourths of polystyrene that goes out the door goes upstairs," he says. So Tjiattas contacted building tenants and asked if they'd participate in collection. Now, office personnel collect takeout containers and bring full bags down to the restaurant. Even customers from surrounding buildings are beginning to participate. An added benefit: When customers bring back takeout containers, many buy something from the restaurant.

Moving From Disposables to Permanent Ware Saves Money in Some Cases

At 600-bed St. Paul Medical Center in Dallas, Kennon Moffitt, director of nutrition services, was seeing 5% to 7% increases within a month in the cost of disposables for her cafeteria. In 1990, using a disposables vs. permanent ware cost-comparison guide from Food Service Systems Analysis, Design and Implementation (edited by G.E. Livingston and E.M. Change, Academic Press, 1979), Moffitt found she could save \$60,000 by going to permanent ware. (Part of that savings came from the improved energy efficiency of a new dish machine that was already in the budget.) "Even though the model used in the book is old, it still works," she says.

Eat Your Vegetables Restaurants, California

Eat Your Vegetables Restaurants food chain in California donates over 500 pounds of specialty vegetables per week to save money. Ted Jones, founder of the restaurant chain says "After six years, only 10% of our waste is going to the landfill. We used to have two 4-yd bins picked up twice a week. We now have one 1-yd bin picked up once a week. In the last five years, garbage -hauling fees have gone up 200%, but our garbage costs are only one-tenth of what they used to be. I would guesstimate we're saving about \$300 a month in hauling costs." The restaurants have a number of waste reduction practices in place including:

- Recycling glass and donating leftover food to soup kitchens and shelters. The owner also found some exotic bird-breeders to take vegetable trimmings every week;
- Stacking boxes and giving them to a produce firm that needs them;
- Composting food scrapings, soiled napkins and tray liners (this alone reduced the waste stream by a third).

These kind of humanitarian efforts are in part a marketing ploy. "People like to support businesses that support the local community" says Ted Jones. The question is "Can we save some money doing this? We're all bottom-line oriented". ("Top of the Heap" in Restaurant Business, v94, n9. June 10, 1995.)

Red Lobster in South Burlington, Vermont

Scott Tryon, general manager of 185 seat restaurant began a pilot program of large-scale food waste reduction. After 2 months landfill tipping fees were trimmed by \$200 a month. The restaurant has achieved a high success rate with its waste reduction program. "The major obstacle to a good waste-reduction program is convincing employees to comply with the rules. It only takes one or two new people not to be aware of the rules to make the program not be a success." ("Top of the Heap" in Restaurant Business, v94, n9. June 10, 1995.)

Pandl's In Bayside Wisconsin and Eagan's In Milwaukee

Pandl's and Eagan's are owned by Jim Pandl. Together the restaurants are doing \$5 million in sales annually. The 210 seat Pandl's reduces, reuses, or recycles 88% of its waste by doing the following:

- Using cardboard balers to cut trash hauling bill in half;
- Breaking down wood crates and offering the wood to his customers for kindling;
- Composting material;
- Channeling heat from walk-in cooler compressor lines to tanks that pre-heat water for the main water heaters.

Pandl says "When people ask me why I do so much waste reduction, I tell them clearly -- it's for the money". "When you start getting into it, you find savings all over the place" he adds. "Some efforts save pennies, like replacing air freshener spritzers with plants, but it all adds up." ("Systems and Service. The Green Restaurant, Part 2" in Restaurants and Institutions. May 1, 1994.)

Baldwin Park, California-based In-N-Out Burgers

About five years ago, In-N-Out Burgers began delivering all of its meat patties and bagged dressing to its units in reusable plastic tubs. The director of support services says "The initial incentive to switch from the waxed cardboard shipping containers was not environmental but financial". The 94-unit chain recovered the \$140,000 cost of the tubs and crate-washing machines in 11 months. Other source reductions include

switching to refillable soda syrup tanks instead of bag-in-the-box and increasing the case size of cups so that the units order 10% fewer cases for the same number of cups. Over five years, the chain has saved \$80,000 in trash-hauling costs. ("Systems and Service. The Green Restaurant, Part 2" in Restaurants and Institutions. May 1, 1994.)

Kelseys Restaurant Saves 59% In Disposal Costs

Kelsey's Restaurant in Waterloo, Ontario reduced their waste by 65% and cut their waste disposal cost by 59% by implementing the following 3R program:

- Recycling newspaper, cardboard, beverage and food cans and plastic (a baler was leased for cardboard);
- Installing permanent filters in the coffee machines;
- Encouraging suppliers to take back their packaging materials.

(Characterization of ICI Recycling in Ontario. OMMRI, 1991.)

6.0 OTHER HELPFUL INFORMATION

ASSOCIATIONS

Canadian Food Services Executives Association
3529-1531 Bayview Ave.
Toronto, ON, CA. M4G 4G8
ph: 416. 421-5045
fax: 416. 421-5045

Canadian Franchise Association
5045 Orbitor Dr.
Bldg. 12, Unit 201
Mississauga, ON, CA. LAW 4Y4
ph: 905. 625-2896
fax: 905. 625-9076

Canadian Hospitality Institute
213-300 Adelaide St. East
Toronto, ON, CA. M5A 1N1
ph: 416. 363-3401
fax: 416. 363-3403

Canadian Restaurant and Foodservices Association
316 Bloor St. West
Toronto, ON, CA. M5S 1W5
ph: 416. 923-8416
fax: 416. 923-1450

Canadian Sanitation Supply Association
G10-300 Mill Rd.
Etobicoke, ON, CA. M9C 4W7
ph: 416. 620-9320
fax: 416. 620-7199

Foodservice Purchasing Association of Canada
P.O. Box 689
King City, ON, CA. L0G 1K0
ph: 905. 841-1803
fax: 905. 841-7808

Hotel Association of Canada
1016-130 Albert St.
Ottawa, ON, CA. K1P 5G4
ph: 613. 237-7149
fax: 613. 238-3878

Ontario Hotel and Motel Association
220-2560 Madison Blvd. East
Mississauga, ON, CA. L4W 4Y9
ph: 905. 602-9650
fax: 905. 602-9654

Ontario Restaurant Association
121 Richmond St. West
Toronto, ON, CA. M5H 2K1
ph: 416. 359-0533
fax: 416. 359-0531

OTHER HELPFUL INFORMATION

American National Association of College and University Food Services
200-220 South 40th St.
Philadelphia, PA, USA. 19104
ph: 215. 573-9240
fax: 215. 898-2469

American National Restaurant Association
1200 17th St. North West
Washington, DC, USA. 20036-3097
ph: 202.331-5900
fax: 202. 331-2429

International Foodservice Manufacturers Association
4400-2 Prudential Plaza
180 North Stetson Ave.
Chicago, ILL, USA. 60601
ph: 312. 540-4400
fax: 312. 540-4401

North American Association of Food Equipment Manufacturers
401 North Michigan Ave.
Chicago, ILL, USA. 60611 USA
ph: 312. 644-6610
fax: 312. 527-6658

ENERGY MANAGEMENT INFORMATION

Further information in greater detail will be produced by the Buildings Energy Technology Transfer (BETT) Program. To get on a mailing list for BETT restaurant publications, fill out the feedback form which follows and return to:

BETT Program
Energy, Mines and Resources Canada
580 Booth Street
Ottawa, Ontario K1A 0E4

If you have specific technical questions concerning your restaurant, contact the BETT lead agency for restaurants:

Restaurant Energy Technology Transfer Program
Department of Mechanical Engineering
University of Manitoba
230 Engineering Building
Winnipeg, Manitoba R3T 2N2
ph: 204. 474-9933
fax: 204. 474-9463

The Canadian Hospitality Industry (hotels, motels, restaurants, lodges, etc.) has an energy management task force which provides various forms of information to the industry. Contact them at:

Canadian Hospitality Industry Energy
Management Task Force (Energaction)
Suite 1016
130 Albert Street
Ottawa, Ontario K1P 5G4
ph: 613. 238-3883

7.0 REFERENCES

- American Society of Heating, Refrigerating and Air Conditioning Engineers. *ASHRAE Handbook, 1988 Equipment*.
- American Society of Heating, Refrigerating and Air Conditioning Engineers. *ASHRAE Handbook, 1990 Refrigeration*.
- Biocycle. June 1995. "Quick Service Restaurants Target Organics". *Biocycle*, vol. 36, pg 80-82.
- Buchanan, Robert. 1990. *Foodservice Waste Management: A Model for Action*. Purdue University, West Lafayette, Indiana
- Buildings Energy Technology Transfer Program. 1984. *Profit by Con\$erving Energy in Your Restaurant*. Energy Mines and Resources Canada.
- Canadian Gas Research Institute. 1996. *Technology Review of Commercial Food Service Equipment*.
- Canadian Restaurant and Foodservices Association. 1992. *Going Green Without Seeing Red*, CRFA, Toronto, Ontario
- Carter, Thomas E., Vent Master. 1995. *Kitchen Ventilation Systems*.
- Foodservice & Hospitality. July 1992. "Restaurant Groups are Developing Ways to Recycle, Reuse or Convert Packaging Materials". *Foodservice & Hospitality*, vol 24, pg. 17-20.
- Foodservice & Hospitality. July, 1993. "Restaurants: Saving Money, Reducing Waste". *Foodservice & Hospitality*, vol 25, pg 106-107.
- Foodservice & Hospitality. December 1995. "Barryvale Lodge wins Environmental Award". *Foodservice & Hospitality*, vol 27, pg. OH2.
- Foodservice & Hospitality. December 1995. "The Green Way". *Foodservice & Hospitality*, vol 27, pg. 27-38.
- Greater Vancouver Regional District. January 1993. *Waste Flow and Recycling Audit*, GVRD, British Columbia.
- Green Workplace. 1994. *Get a Grip on Greening*. Government of Ontario, Toronto
- Green Workplace. June 1994. *Organic Waste Management Study: Government, Residential and Institutional Facilities*. Government of Ontario, Toronto
- KPMG. 1995. *1995 Canadian Restaurant Industry Operations Report*. Prepared for the Canadian Restaurant and Foodservices Association, Toronto, Ontario.
- Leibowitz, Avery. March 1996. *Ontario Restaurant Association Financial Analysis: Restaurant Business*. Prepared for the Ontario Restaurant Association, Toronto, Ontario.
- Lorenzini, Beth. May 1994. *Systems and Service, The Green Restaurant, Partz*. Restaurants and Institutions.
- Modlin, Robert A. 1989. *Commercial Kitchens*. American Gas Association, Seventh Edition.

REFERENCES

- National Restaurant Association. 1982. *Energy Management System: Worksheets*. National Restaurant Association, Washington D.C.
- National Restaurant Association. 1986. *Energy Management System*. National Restaurant Association, Washington D.C.
- North American Association of Food Equipment Manufacturers. First Edition. *An Introduction to the Foodservice Industry*.
- Palmer, John D., Van Nostrand Reinhold. 1990. *Principles of Hospitality Engineering*.
- Rahbar, Shahrazad and Senka Krsikapa. May 1996. *Technology Review of Commercial Food Service Equipment*. Prepared for Natural Resources Canada, Ontario Ministry of Environment and Energy, and Consumers Gas Company by the Canadian Gas Research Institute and Fisher Consultants.
- Resource Integration Systems. May 1992. *National Waste Minimization Study*. Prepared for the Quick Service Restaurant Council, Toronto.
- Resource Integration System. 1994. *ARA Energy Conservation Guide*. Prepared for ARAMARK, USA.
- San Francisco Recycling Program. 1994. *Food for Thought: San Francisco Restaurants' Guide to Waste Reduction and Recycling*
- SWEAP. June 1991. *Waste Composition Study*. Metropolitan Toronto Department of Works, Ontario.
- Unklesbay and Unklesbay. 1982. *Energy Management in Foodservice*. AVI Publishing Company, Inc.
- Unklesbay, Nan. 1982. *Energy Management in Foodservice*. The AVI Publishing Company, Westport, Connecticut.
- Versa. 1991. *Environmental Planning Manual*. Versa Services, Toronto.

APPENDIX A

RESOURCE CONSERVATION WORKSHEETS

APPENDIX A
MINISTRY OF ENVIRONMENT AND ENERGY FOOD SERVICE SECTOR
GUIDE ON RESOURCE CONSERVATION AND COST SAVINGS

WATER CONSUMPTION WORKSHEET

Facility Position	Typical Value
Water Utilization	
Annual Water Cost:	0.2% of annual sales 9% of utility costs
Water Cost per Cubic Metre _____ \$/m ³	\$0.80-\$1.20
Annual Water Consumption: _____ m ³	
Hot Water Cost	
Estimated % of Hot Water Use: _____	30-50%
Annual Hot Water Consumption: _____ m ³	\$5/m ³ -electric \$1.50/m ³ -nat. gas
Utility Cost for Hot Water per Cubic Metre: _____	
Annual Cost of Hot Water: _____	
Total Annual Cost: _____	

WATER CONSERVATION OPPORTUNITIES

Reduce Water Use In Washrooms

- install aerators in sinks
- install automatic water on/off controls
- retrofit toilets to reduce waste use per flush
- install low flow toilets
- repair leaky faucets

Reduce Water Use In Food Preparation

- reduce volume of water used to thaw food
- install a foot pedal to turn tap on and off

Reduce Water Use In Dishwashing

- wash only full racks
- install new water/energy efficient dishwasher

Reduce Water Use In Ice Making

- where possible, use flakes instead of cubes

APPENDIX A

MINISTRY OF ENVIRONMENT AND ENERGY FOOD SERVICE SECTOR GUIDE ON RESOURCE CONSERVATION AND COST SAVINGS

WASTE REDUCTION WORKSHEET

Facility Position	Typical Value
Water Generation _____ tonnes/year Annual Waste Management Cost: - Recycling \$ _____ - Grease \$ _____ - Food Scraps \$ _____ - Garbage \$ _____ - Total \$ _____	1.5 to 1.8 tonnes per employee per year i.e. 15 to 18 tonnes per year, if there are 10 employees 0.4% to 0.5% of annual sales 25% to 30% of energy cost total

WASTE REDUCTION OPPORTUNITIES

Reduce Packaging Waste

- Use reusable rather than disposable dishware where possible
- Discuss packaging with suppliers
- Investigate using reusable containers with suppliers

Divert Recyclables Material

- Set up cardboard recycling program
- Set up can and bottle recycling program
- Contact hauler and see if contract cost will be reduced

Divert Food Scraps

- Send suitable food to food bank or food agency
- Investigate using food scraps as animal feed
- Investigate on-site composting or vermicomposting
- Investigate off-site composting
- Contact hauler to see if diversion of food scraps cost-competitive

APPENDIX A

MINISTRY OF ENVIRONMENT AND ENERGY FOOD SERVICE SECTOR GUIDE ON RESOURCE CONSERVATION AND COST SAVINGS

ENERGY CONSERVATION WORKSHEET

Facility Position	Typical Value
Energy Consumption	
Annual Energy Cost (Electricity and Natural Gas)	
Annual Electricity Cost: \$ _____	1.6% to 2.7% of business costs
Annual Electricity Consumption: \$ _____ kWh	
Average Annual Monthly Demand: \$ _____ kW	
Average Cost per kWh: \$ _____ \$/kWh	
Annual Natural Gas Cost: \$ _____	\$0.085
Annual Natural Gas Consumption: \$ _____ cu m	
Average Cost per cu m: \$ _____ \$/cu m	
	\$0.180

ENERGY CONSERVATION OPPORTUNITIES

Lighting

- Replace 40W fluorescent lamps with 34 W lamps
- Replace fluorescent lamps and ballasts with T8 lamps and electronic ballasts
- Replace incandescent lamps with compact fluorescent
- Replace incandescent spotlamps with quartz halogen
- Retrofit exit signs with low energy type (2 W/fixture)
- Install high intensity discharge outdoor lighting

Kitchen

- Install low energy dishwasher
- Rebalance kitchen exhaust/makeup air
- Turn off duplicate appliances during slower times
- Maintain refrigeration units at least twice/year
- Install kitchen exhaust heat recovery units
- Clean kitchen exhaust filters, fans and ducts

Dining Area

- Recommission rooftop HVAC controls
- Maintain rooftop HVAC systems at least twice/year

General

- Install programmable thermostats for unoccupied set back
- Install high efficiency water heater
- Insulate hot water tank and pipes
- Weatherize windows and doors
- Retrofit windows with sealed double glazed low-E
- Increase roof insulation

APPENDIX B

ADVISORY GROUP MEMBERS

APPENDIX B
FOOD SERVICE SECTOR GUIDEBOOK ADVISORY GROUP MEMBERS

	Phone Number	Fax Number
Bob Bach Engineering Interface	416-226-6565	416-226-6576
Nancy Bonham Proctor & Redfern	519-570-4274	519-570-3379
Don Copithorn Consumers Gas	416-496-7179	416-496-7182
Simona Gasparetto Industrial conservation Branch	416-327-1484	416-327-1261
Pamela Georgopoulos City of Toronto	416-392-1459	416-392-1456
Lisa Jordon Ontario Restaurant Association	416-359-0533	416-359-0531
Maria Kelleher Resource Integration Systems	416-480-2420	416-480-2419
Paul Oliver Ontario Restaurant Association	416-359-0533	416-359-0531
Brian Van Opstal Waste Reduction Branch	416-325-4435	416-325-4437
Janet Robins Resource Integration Systems	416-480-2420	416-480-2419
Pamela Young Ministry of Agriculture, Food & Rural Affairs	519-826-4451	519-826-4333

APPENDIX C

SITE VISIT REPORTS

APPENDIX C
GUIDE TO RESOURCE CONSERVATION AND COST SAVING
OPPORTUNITIES IN THE FOOD SERVICE SECTOR
SITE VISIT REPORT #1

FOOD SERVICE SECTOR FACILITY #1: FINE DINING
DATE: 9 June, 1997

GENERAL DESCRIPTION

Full service restaurant, open six days/week, Monday to Saturday, closed Sunday.

Full time staff: 28
Part time staff: 2
Floor area: 3,000 sq. ft
Annual sales: \$1,170,000

Downstairs restaurant: seats 50
Upstairs restaurant: seats 150
Patio: seats 100
Total capacity: 300

Food preparation takes place in basement kitchen, cooking takes place in upstairs kitchen on second floor. The restaurant serves lunch and dinner, and has capacity to hold receptions (weddings, business meetings, etc.) Business varies mostly with the weather.

ENERGY

Costs

Energy costs include \$19,321 for electricity and \$4,685 for gas.

Energy Utilization and Conservation

4. Do you have monthly energy billing records for 1996?

electricity yes _____ no _____
gas yes _____ no _____

If yes, please attach copies or a summary.

If no, do you know the total cost and or consumption of energy in 1996?

If yes, please provide the following summaries:

total natural gas cost (1996)	\$3,600	consumption	_____	cu m
total electricity cost (1996)	\$19,200	consumption	_____	kWh
total fuel oil cost (1996)	\$N/A	consumption	_____	L

5. What was the investment in energy conservation measures in your establishment, and what savings were anticipated?

Last year: Investment \$ _____ Expected savings: \$ _____
Last 5 years: Investment \$ _____ Expected savings: \$ _____

6. Please check the type of energy used for various pieces of equipment at your establishment, and the approximate proportion of the total energy for the establishment consumed by each device.

Equipment	No. of Units	type of energy used		estimated proportion of energy consumed		
		gas	electricity	high	medium	low
KITCHEN						
broiler	1	X			X	
grill						
deep fryer						
oven						
toaster						
dishwasher	1		X			
standard fridge	1		air			
standard freezer						
walk-in fridge	1		air			
walk-in freezer	1		air			
exhaust/ventilation						
other - soup warmer	1		X			
BAR						
ice machine	1		air			
draft beer fridge						
bottled beer fridge	1		air			
wine fridge	1		air			
other - glass waster						
DINING AREA						
heating (rooftop)		X		X		
air conditioning			X	X		
food warmers						
other						
GENERAL						
water heater	1		X	X		
other						

7. Have any of the following lighting retrofit measures been implemented in your establishment?

measure	Implemented	not Implemented
replace 40W fluorescent lamps 34 W lamps		
replace fluorescent lamps and ballasts with T8 lamps and electronic ballasts		X
replace incandescent lamps with compact fluorescent	X	
replace incandescent lamps with quartz halogen	X	
retrofit exit signs with low energy type		
install high intensity discharge outdoor lighting		
other	X	

8. Have any of the following energy conservation activities been undertaken at your establishment?

energy conservation measures	already completed	planned for next year	not completed
KITCHEN AREA			
install low energy dishwasher			
install heat recovery/exchange units			
— kitchen exhaust			
— grey water			
— other			
rebalance kitchen exhaust/makeup air			
regular maintenance of refrigeration units (twice/year min.)	X		
other			
DINING AREA			
recommission rooftop HVAC controls			
regular maintenance of rooftop HVAC systems (at least twice/year)	X		
other			
GENERAL			
install programmable thermostats for unoccupied setback			
install high efficiency water heater			
insulate hot water tank and pipes			
weatherize windows and doors			
retrofit windows with sealed double glazed low-E			
increase roof insulation			
other			

9. Other Comments:

Lighting is by incandescent lamps except in service areas, which have a few fluorescents. Building is owned by the city, HVAC provided by the landlord.

WATER

Costs

Water and sewer charges are \$2,388/year.

Existing System and Resource Conservation Measures Implemented

This property was included in a project conducted by Proctor and Redfern for the City of Toronto on water conservation. Under this program a detailed survey of water use was conducted and water conservation measures for the toilets (low flow) were implemented.

Equipment using water is as follows:

- 8 washroom sinks
- 8 toilets
- 2 urinals
- 1 kitchen dishwasher - Champion K3100
- 1 bar dishwasher - Barrie B24 - glasses only

- 1 ice maker - Whirlpool CECS 2WF2 - air cooled, 250 lb capacity
- 3 kitchen sinks (2 on the main floor, 1 downstairs)
- 1 bar sink
- 1 service sink

Opportunities for Resource Conservation

Faucets - one problem that was noted was that several faucets were leaking. The faucets are repaired on a regular basis but with the number of times they are turned off and on a day, the parts wear and the result is leaks. Replacing the bathroom faucets with metering faucets (self closing after a few seconds) is an option.

To reduce water use in the kitchen faucets, a foot operated faucet may be an option.

Dishwashers - wash only full loads, have the equipment serviced regularly to ensure its is functioning efficiently

New equipment - when considering any new purchases of equipment, ensure that the equipment (i.e. ice machine or dishwasher) is energy and water efficient.

WASTE

Costs

Grease is picked up for \$9/month (\$108/year).

Garbage and recyclables are picked up at no cost by municipal forces, as part of property taxes.

Existing System and Resource Conservation Measures Implemented

Cardboard, glass and cans are recycled, and are picked up by municipal forces at no cost.

Waste is picked up by municipal forces 6 nights/week at no direct cost.

Waste is stored in a small area at the bottom of the back stairs connecting different floors. It is double-bagged to eliminate odours, and put into the alleyway for nightly pick-up. Quantities of waste disposed vary with the business volume, and can be 1 to 15 bags/night.

Opportunities for Resource Conservation

There is no strong incentive to divert waste, as waste collection is carried out free by the municipality.

Source separation of food waste for composting would be feasible in the basement food preparation kitchen, however, the logistics of getting food waste to the ground level (no elevator, only stairs) limits the practicality of this option. The kitchen where cooking takes place is much too small to allow any food waste separation.

Food waste diversion options have not been pursued because of space restrictions and concern with any odours which would be generated.

The restaurant uses fresh food (very little frozen), therefore the food waste becomes odorous fairly quickly, particularly fresh fish. Cleanliness and no odours are essential to this high end business, therefore any practice which would impact on either of these will not be implemented. Manager would prefer to burn everything, to ensure that all silverware discarded with food is recovered.

APPENDIX C
GUIDE TO RESOURCE CONSERVATION AND COST SAVING
OPPORTUNITIES IN THE FOOD SERVICE SECTOR
SITE VISIT REPORT #2

FOOD SERVICE SECTOR FACILITY #2: FAST FOOD
DATE: June 12, 1997

GENERAL DESCRIPTION

Quick service restaurant, open Monday to Sunday

Full time staff:

Part time staff:

Floor area: sq. ft

Annual sales: \$

Total capacity: 88 seats

ENERGY

Costs

Dave has provided 12 months of electricity and gas bills for Bob Bach to review and analyze.

Energy Utilization and Conservation

4. Do you have monthly energy billing records for 1996?

electricity yes √ no
gas yes √ no

If yes, please attach copies or a summary.

If no, do you know the total cost and or consumption of energy in 1996?

If yes, please provide the following summaries:

total natural gas cost (1996)	<u>\$9,343</u>	consumption	<u>50,821</u>	cu m
total electricity cost (1996)	<u>\$19,557</u>	consumption	<u>256,819</u>	kWh
total fuel oil cost (1996)	<u>\$</u>	consumption	<u> </u>	L

5. What was the investment in energy conservation measures in your establishment, and what savings were anticipated?

Last year: Investment \$ Expected savings: \$

Last 5 years: Investment \$ Expected savings: \$

6. Please check the type of energy used for various pieces of equipment at your establishment, and the approximate proportion of the total energy for the establishment consumed by each device.

Equipment	No. of Units	type of energy used		estimated proportion of energy consumed		
		gas	electricity	high	medium	low
KITCHEN						
broiler						
grill	1	X				
deep fryer	4	X	X			
oven						
toaster	1		X			
dishwasher						
standard fridge						
standard freezer	1		air			
walk-in fridge	1		water			
walk-in freezer	1		water			
exhaust/ventilation	1		X			
other - makeup air unit	1		X			
BAR						
ice machine	1		air			
draft beer fridge						
bottled beer fridge						
wine fridge						
other - soft drink blender	1		X			
DINING AREA						
heating	2	X				
air conditioning	2		X			
food warmers						
other						
GENERAL						
water heater	1	X				
other						

7. Have any of the following lighting retrofit measures been implemented in your establishment?

measure	Implemented	not Implemented
replace 40W fluorescent lamps 34 W lamps		
replace fluorescent lamps and ballasts with T8 lamps and electronic ballasts	X	
replace incandescent lamps with compact fluorescent	X	
replace incandescent lamps with quartz halogen	X	
retrofit exit signs with low energy type		
install high intensity discharge outdoor lighting	X	
other		

8. Have any of the following energy conservation activities been undertaken at your establishment?

energy conservation measures	already completed	planned for next year	not completed
KITCHEN AREA			
install low energy dishwasher			
install heat recovery/exchange units			
— kitchen exhaust			
— grey water			
— other			
rebalance kitchen exhaust/makeup air			
regular maintenance of refrigeration units (twice/year min.)	X		
other			
DINING AREA			
recommission rooftop HVAC controls			
regular maintenance of rooftop HVAC systems (at least twice/year)	X		
other			
GENERAL			
install programmable thermostats for unoccupied setback	X		
install high efficiency water heater			
insulate hot water tank and pipes			
weatherize windows and doors			
retrofit windows with sealed double glazed low-E			
increase roof insulation			
other - turn off vestibule heater	X		

9. Other Comments:

All food is delivered in disposable containers. Management are very energy conscious.

WATER

Costs

Based on billings from March '96 to February '97 the annual water and sewer costs were \$6,547 for a total consumption of 738.5 m³.

Existing System and Resource Conservation Measures Implemented

The following water using equipment was identified:

- Women's washroom:
 - 2 18L tank-type toilets
 - infrared sensors on low volume faucets
- Men's washroom:
 - 2 infra-red controlled urinals
 - 1 - 18L tank-type toilets
- 1.3-year old Hoshizaki water cooled ice machine
- Large dish sink with faucets for hand washing of pots
- Staff hand-sink c/w infra-red sensor faucet control

- Trigger nozzle on janitor's sink
- Water cooled beverage cooling unit
- Water cooled walk-in refrigerators and freezers
- No dishwasher

Opportunities for Resource Conservation

Manager is strongly motivated for implementation of resource conservation. Because of very slim margins, paybacks must be low.

Infra-red sensors on washbasins and urinals are a standard for new facilities. Additional opportunities for water conservation include:

- low flow toilets or addition of flush volume reducers to existing toilets
- replacement of water cooled ice machine and beverage cooling units when existing equipment is aged and obsolete
- replacement of water cooled refrigeration is not likely a cost-effective option

WASTE

Costs

Annual waste management costs are:

Material	\$/Month	\$/Year	\$/Collection
Waste	\$429.17	\$5,150	\$33.26
Cardboard	\$79.65	\$955.80	\$18.52
Plastic/Paper/Food	\$136.60	\$1,639.20	\$31.77
Total Recycling Costs	\$216.25	\$2,595	\$50.29
Grease Trap Cleaning	\$58.65	\$703.80	\$58.65
Grease Removal	\$3.71	\$44.52	\$3.71

Existing System and Resource Conservation Measures Implemented

Facility has been contracting all waste management services to a company who would then make the necessary arrangements with sub-contractors to collect waste and various recyclable materials. This arrangement has just been switched at the time of the site visits to another services company.

Cardboard is collected in a 4 cubic yard front-end loader bin on a once per week basis.

A mixed recyclables program includes food waste, mixed plastics and recyclable paper. Food waste (e.g. buns, egg shells), collected from three stations in the food preparation area. The separated food waste is stored in two, 64 gallon roll-out carts that are collected once per week.

Mixed plastics (primarily film plastic bags) are collected from one main area in the food preparation area and stored in a 95 gallon roll-out cart that is collected once per week. Mixed paper (primarily newspaper, office paper) is collected from the office and public area and stored in a 95 gallon roll-out cart that is collected once per week.

Grease is collected once per month and the grease trap is cleaned once per month.

A bag compactor is located in the salad preparation area and most waste from behind the counter is compacted into one bag. General waste from the seven front of the house waste bins is also supposed to go into the bag compactor, however a check of the dumpster bin found a number of uncompacted bags. The waste is collected in an 8 cubic yard front end loader bin and is collected three times per week.

Opportunities for Resource Conservation

Limited opportunities were observed due to the limited waste stream and the extensive recycling programs in place.

Dave has investigated placing a polystyrene only collection bin in the public area, however, due to limited space he could not accommodate the bin.

Most issues relate to staff participation and training regarding the various separation requirements for food, paper and plastic.

Cardboard boxes should always be flattened to reduce space in the bin. Five boxes were also found in the waste dumpster bin during the visit.

APPENDIX C
GUIDE TO RESOURCE CONSERVATION AND COST SAVING
OPPORTUNITIES IN THE FOOD SERVICE SECTOR
SITE VISIT REPORT #3

FOOD SERVICE SECTOR FACILITY #3: FAMILY DINING
DATE: 9 June, 1997

GENERAL DESCRIPTION

Full service family restaurant, open 24 hrs/day, 7 days/week. Also provides take-out service.

Full time staff: 35
 Part time staff: 25
 Floor area: 10,000 sq. ft
 Annual sales: \$2,080,000

ENERGY

Costs

Not available, bills all paid by head-office. Manager did not know what the costs were. Her main focus is lowering labour costs

Equipment	No. of Units	type of energy used		estimated proportion of energy consumed		
		gas	electricity	high	medium	low
KITCHEN						
broiler	1	X				
grill	3	X				
deep fryer	2		X			
oven						
toaster						
dishwasher	1		X			
standard fridge	2		X			
standard freezer						
walk-in fridge	2		X			
walk-in freezer	1		X			
exhaust/ventilation						
other						
BAR						
ice machine						
draft beer fridge						
bottled beer fridge	1		air			
wine fridge						
other						
DINING AREA						
heating	1	X				
air conditioning	1		X			
food warmers						
other						
GENERAL						
water heater	2		X	X		
other						

Have any of the following lighting retrofit measures been implemented in your establishment?

measure	Implemented	not Implemented
replace 40W fluorescent lamps 34 W lamps		X
replace fluorescent lamps and ballasts with T8 lamps and electronic ballasts		X
replace incandescent lamps with compact fluorescent		X
replace incandescent lamps with quartz halogen		X
retrofit exit signs with low energy type		X
install high intensity discharge outdoor lighting		
other		

Have any of the following energy conservation activities been undertaken at your establishment?

energy conservation measures	already completed	planned for next year	not completed
KITCHEN AREA			
install low energy dishwasher	X		
install heat recovery/exchange units			
— kitchen exhaust			
— grey water			
— other			
rebalance kitchen exhaust/makeup air			
regular maintenance of refrigeration units (twice/year min.)			
other			
DINING AREA			
recommission rooftop HVAC controls			
regular maintenance of rooftop HVAC systems(at least twice/year)			
other			
GENERAL			
install programmable thermostats for unoccupied setback			
install high efficiency water heater			
insulate hot water tank and pipes			
weatherize windows and doors			
retrofit windows with sealed double glazed low-E			
increase roof insulation			
other			

Other Comments:

Site management not responsible for energy costs. All interior lights left on during daytime by management directive. HVAC provided by landlord - cooling not adequate on day of visit. Blinds on extensive west side glass should be kept closed.

WATER

Costs

No information available.

Existing System and Resource Conservation Measures Implemented

The following water using equipment was identified:

- Conveyor type Hobart dishwasher
- 2 very large sinks and 3 smaller sinks in kitchen/dishwashing/bar areas
- Staff washrooms: 2-18L tank-type toilets each; two sinks c/w high volume faucets
- Public washrooms:
 - women's: 5 flush-valve type 18 L toilets; no faucet aerators
 - men's: 4 flush valve urinals; 3 flush valve 18 L toilets
- Air cooled drink machines
- Water cooled refrigeration and ice-machine

Opportunities for Resource Conservation

As there is little awareness of water use impacting service costs, there is little incentive or motivation for water use efficiency. Should the management desire to implement some water efficiency measures, the following strategies should be considered:

- Installation of flush volume reducers in the staff washroom tank-type toilets, or replacement with ULF type fixtures when equipment replacement is necessary; retrofits to the existing public flush-valve type toilets should be considered depending on usage and subsequent payback evaluation.
- The manual control of the belt conveyor on the dishwasher provides opportunities for water and energy waste if the dishwasher is left unattended. Provision of an infra-red sensor should be considered.
- The Hobart dishwasher appears to be operating in the "water" mode and not taking advantage of the chemical mode; modifying it's operation would reduce energy costs.
- Installation of faucet aerators on all sinks would reduce water use in the lavatories.
- Water cooled refrigeration and ice machine consumes large volumes of water. Although it would not be practical to replace the refrigeration equipment, replacing the ice machine with a water cooled model when it requires replacement, should be considered

WASTE

Quantities and Costs

The manager had no idea how much waste was generated.

Waste and recyclables are picked up by the municipality at no cost to the restaurant.

Existing System and Resource Conservation Measures Implemented

A recycling system has been implemented for cardboard, can sand bottles, which are separated for pick-up by municipal forces twice per week (Monday and Thursday).

Garbage is picked up by municipal forces 6 nights/week, at no cost.

Most of the food preparation is carried out at a commissary off-site, therefore food preparation waste quantities are low.

Garbage room is 10'x8', contains shelves for flattened cardboard. There appears to be ample room for source separating and storing recyclables.

Opportunities for Resource Conservation

The manager was not interested in additional waste diversion opportunities, as there is no economic incentive to do so. She formerly worked in Kingston, where they had a food diversion project. This made sense because of the high cost of waste disposal.

Labour costs are the highest cost for this operation, and the manager's job description is to reduce labour costs as much as possible. Any waste diversion activity that required additional labour costs would not be considered.

APPENDIX C
GUIDE TO RESOURCE CONSERVATION AND COST SAVING
OPPORTUNITIES IN THE FOOD SERVICE SECTOR
SITE VISIT REPORT #4

FOOD SERVICE SECTOR FACILITY #4: HOME FOR THE AGED
DATE: June 23, 1997

GENERAL DESCRIPTION

Home for the Aged, with 275 full time residents. Dining room is sometimes used as a banquet hall (seating capacity 400). The main kitchen is on the ground floor, with small kitchen facilities on each of five floors.

ENERGY

Energy Utilization and Conservation

General Comments:

- This kitchen supplies 3 meals per day for the 300 residents of the nursing home at the Columbus Centre.
- The meals are served in dining rooms on each floor, which are not a part of the food preparation
- There is a banquet facility on the main floor which can seat up to 400 people.
- There is no separate accounting for the energy used by the food preparation area, although the nursing home does an allocation.
- The nursing home took the opportunity of retrofitting the lighting throughout the building using the Ontario Hydro Lighting Incentive program.
- The food preparation kitchen is separated from the dishwashing area. There is also a cafeteria area for serving coffee and light snacks. Both of these are included in the survey.

6. Please check the type of energy used for various pieces of equipment at your establishment, and the approximate proportion of the total energy for the establishment consumed by each device.

Equipment	No. of Units	type of energy used		estimated proportion of energy consumed		
		gas	electricity	high	medium	low
KITCHEN						
broiler						
grill	1	X				X
deep fryer	1	X				X
oven	3		X		X	
toaster	1		X			X
dishwasher	1		X	X		
standard fridge	1		X			X
standard freezer						
walk-in fridge	2		X			X
walk-in freezer	1		X			X
exhaust/ventilation	1		X		X	
soup cauldrons	3		X			X
other - pizza oven	6	X			X	

6. (cont'd)

Equipment	No. of Units	type of energy used		estimated proportion of energy consumed		
		gas	electricity	high	medium	low
BAR						
ice machine	1		X			
draft beer fridge						
bottled beer fridge						
wine fridge						
other						
DINING AREA						
heating						
air conditioning						
food warmers	4		X			X
coffee makers	1		X			X
other						
GENERAL						
water heater (booster)-	1		X			
other						

7. Have any of the following lighting retrofit measures been implemented in your establishment?

measure	Implemented	not Implemented
replace 40W fluorescent lamps 34 W lamps		
replace fluorescent lamps and ballasts with T8 lamps and electronic ballasts	X	
replace incandescent lamps with compact fluorescent	X	
replace incandescent lamps with quartz halogen		
retrofit exit signs with low energy type	X	
install high intensity discharge outdoor lighting		
other		

8. Have any of the following energy conservation activities been undertaken at your establishment

energy conservation measures	already completed	planned for next year	not completed
KITCHEN AREA			
install low energy dishwasher			X
install heat recovery/exchange units			
— kitchen exhaust			X
— grey water			X
— other			
rebalance kitchen exhaust/makeup air			X
regular maintenance of refrigeration units (twice/year min.)			
other			

8. (cont'd)

energy conservation measures	already completed	planned for next year	not completed
DINING AREA			
recommission rooftop HVAC controls			
regular maintenance of rooftop HVAC systems(at least twice/year)			
other			
GENERAL			
install programmable thermostats for unoccupied setback			
install high efficiency water heater			
insulate hot water tank and pipes			
weatherize windows and doors			
retrofit windows with sealed double glazed low-E			
increase roof insulation			
other			

WATER

Existing System and Resource Conservation Measures Implemented

Equipment using water is as follows:

- 2 hand sinks
- 1 prep sink
- 2 sink for washing pots/kitchen equipment
- 3 other general use sinks
- 1 kitchen dishwasher - Hobart CRS86A (hot water, conveyor dishwasher)
- 1 ice maker - Follett

Opportunities for Resource Conservation

This is a large institutional facility with food services only being one of many water consumers. The water use for the kitchen is not monitored separately and as a result there is little incentive to reduce water usage as any reduction cannot be measured and would not directly reduce departmental costs.

- Faucets - equipment was in good repair, no leaking faucets were noted. To reduce water use in the kitchen faucets, a foot operated faucet may be an option.
- Dishwashers - ensure the equipment is operated to ensure that water is used efficiently (ie shut off as soon as dishes are done on the conveyor), have the equipment serviced regularly to ensure its is functioning efficiently.
- New equipment - when considering any new purchases of equipment, ensure that the equipment (i.e. ice machine or dishwasher) is energy and water efficient.

WASTE

Quantities and Costs

The manager had no idea how much waste was generated, or what costs were involved (all waste management is contracted to private companies). Payment for waste management service is handled by accounting department. Energy costs are a much higher concern than waste management costs.

Existing System and Resource Conservation Measures Implemented

Cardboard is recycled. Cardboard recycling was unsuccessful initially, as it was too convenient for staff to throw all waste into the waste bin. Manager re-designed the slot in the garbage bin to be too small for disposal of cardboard. Staff could not throw cardboard in waste bin, and learned to recycle. A flattening table was installed in the garbage room to make cardboard flattening convenient for staff.

The company has saved money as a result of cardboard recycling. Cardboard took up a lot of space in the waste bin, resulting in more waste pick-ups than necessary. With effective cardboard recycling, the costs of waste disposal have been reduced.

Diapers are recycled, and food waste is picked up for use as animal feed.

Cloth napkins are used, reducing the amount of disposable napkins in the garbage.

Opportunities for Resource Conservation

Limited opportunities were identified, as the facility is recycling cardboard and a portion of food waste already.

APPENDIX C
GUIDE TO RESOURCE CONSERVATION AND COST SAVING
OPPORTUNITIES IN THE FOOD SERVICE SECTOR
SITE VISIT REPORT #5

FOOD SERVICE SECTOR FACILITY #5: PUB/TAVERN
DATE: 14 July, 1997

GENERAL DESCRIPTION

Pub and full service restaurant, open 7 days per week, 11:00am to 2:00am.

Full time staff: 13
Part time staff: 2
Floor area: 5,500 sq. ft
Annual sales: Confidential

Downstairs restaurant: seats 51
Upstairs restaurant: seats 80
Courtyard: seats 65
Total capacity: 196

ENERGY

Costs

Energy Utilization and Conservation

4. Do you have monthly energy billing records for 1996?

electricity yes _____ no _____
gas yes _____ no _____

If yes, please attach copies or a summary.

If no, do you know the total cost and or consumption of energy in 1996?

If yes, please provide the following summaries:

total natural gas cost (1996) \$ _____ consumption _____ cu m
total electricity cost (1996) \$10,000 consumption _____ kWh
total fuel oil cost (1996) \$ _____ consumption _____ L

5. What was the investment in energy conservation measures in your establishment, and what savings were anticipated?

Last year: Investment \$ _____ Expected savings: \$ _____
Last 5 years: Investment \$ _____ Expected savings: \$ _____

6. Please check the type of energy used for various pieces of equipment at your establishment, and the approximate proportion of the total energy for the establishment consumed by each device.

Equipment	No. of Units	type of energy used		estimated proportion of energy consumed		
		gas	electricity	high	medium	low
KITCHEN						
broiler	1	X				
grill	1	X				
deep fryer						
oven						
toaster						
dishwasher	1					
standard fridge	3		air			
standard freezer	2		air			
walk-in fridge						
walk-in freezer						
exhaust/ventilation	1		X			
other - salad cooler	1		air			
BAR						
ice machine						
draft beer fridge						
bottled beer fridge	1		air			
wine fridge	3		air			
other - soft drink blender						
DINING AREA						
heating	2	X				
air conditioning	2		X	X		
food warmers						
other						
GENERAL						
water heater	2	mid-eff		X		
other						

7. Have any of the following lighting retrofit measures been implemented in your establishment?

measure	Implemented	not Implemented
replace 40W fluorescent lamps 34 W lamps		X
replace fluorescent lamps and ballasts with T8 lamps and electronic ballasts		X
replace incandescent lamps with compact fluorescent		X
replace incandescent lamps with quartz halogen		X
retrofit exit signs with low energy type		
install high intensity discharge outdoor lighting		
other		

8. Have any of the following energy conservation activities been undertaken at your establishment?

energy conservation measures	already completed	planned for next year	not completed
KITCHEN AREA			
install low energy dishwasher	X		
install heat recovery/exchange units			
— kitchen exhaust			
— grey water			
— other			
rebalance kitchen exhaust/makeup air			
regular maintenance of refrigeration units (twice/year min.)			X
other			
DINING AREA			
recommission rooftop HVAC controls			
regular maintenance of rooftop HVAC systems (at least twice/year)			
other			
GENERAL			
install programmable thermostats for unoccupied setback			
install high efficiency water heater	X		
insulate hot water tank and pipes			
weatherize windows and doors			X
retrofit windows with sealed double glazed low-E			
increase roof insulation			
other			

9. Other Comments:

Light levels are kept extremely low. Kitchen refrigeration equipment is all residential size. Ice cubes are purchased from outside supplier.

WATER

Costs

Water bills were not provided so water consumption is unknown. The pub owner did not consider water and sewage costs to be an issue.

Existing System and Resource Conservation Measures Implemented

The following water using equipment was identified;

- brand new batch-type dishwasher with chemical mode (leased)
- public washrooms complete with old 18+ L tank-type toilets and faucets without faucet aerators
- kitchen and bar sinks

Opportunities for Resource Conservation

Because all of the refrigeration equipment is air cooled, and the ice is purchased, water efficiency opportunities are limited to the domestic uses. All of the toilets and sinks/faucets are relatively old and should be replaced with more water efficient models. Because of the age of the toilets, they may not perform satisfactorily with flush volume reducers. Paybacks on the toilets area function of usage.

WASTE

Costs

Waste and recyclables picked up at no cost by municipality.

Existing System and Resource Conservation Measures Implemented

Waste stored in 3 cu. yd bin and is picked up twice per week by municipality. Waste bin is shared with other tenants in complex, therefore the manager does not know how much waste his tavern generates.

Vegetable oil is stored outside in two 45 gallon drums. These are picked up at no cost by a private company every six weeks.

Recyclables are picked up once per week by municipal forces, at no cost. Cardboard and bottles are recycled. Very few cans are generated by the pub.

Opportunities for Resource Conservation

There is no strong incentive to divert waste, as waste collection is carried out free by municipal forces.

Source separation of food waste for composting would be feasible, but is not of interest to the manager, as waste is currently collected at no cost. The manager felt it was a good idea to use waste food as animal feed, but it would be a hassle, and he is not interested.

His highest cost is labour cost, he does not concern himself with waste issues.

APPENDIX C
GUIDE TO RESOURCE CONSERVATION AND COST SAVING
OPPORTUNITIES IN THE FOOD SERVICE SECTOR
SITE VISIT REPORT #6

FOOD SERVICE SECTOR FACILITY #6: QUICK SERVE TAKE-OUT COFFEE SHOP
DATE: July 17, 1997

GENERAL DESCRIPTION

Coffee shop with muffins baked on-site. All take-out. No seats in winter. Small patio with 12 seats in summer. No customer washroom. Open 7 days/week, 7am to 6pm. Six staff.

ENERGY

4. Do you have monthly energy billing records for 1996?

electricity yes √ no
gas yes no

If yes, please attach copies or a summary.

If no, do you know the total cost and or consumption of energy in 1996?

If yes, please provide the following summaries:

total natural gas cost (1996)	\$ <u> </u>	consumption <u> </u>	c u m
total electricity cost (1996)	\$ <u>7,000</u>	consumption <u> </u>	kWh
total fuel oil cost (1996)	\$ <u> </u>	consumption <u> </u>	L

5. What was the investment in energy conservation measures in your establishment, and what savings were anticipated?

Last year: Investment \$ Expected savings: \$

Last 5 years: Investment \$ Expected savings: \$

6. Please check the type of energy used for various pieces of equipment at your establishment, and the approximate proportion of the total energy for the establishment consumed by each device.

Equipment	No. of Units	type of energy used		estimated proportion of energy consumed		
		gas	electricity	high	medium	low
KITCHEN						
broiler						
grill						
deep fryer						
oven	2		X	X		
toaster						
dishwasher						
standard fridge	3		air	X		
standard freezer	1		air			
walk-in fridge						
walk-in freezer						
exhaust/ventilation						
other - coffee makers	2		X			
- coffee warmers	3		X			
BAR						
ice machine						
draft beer fridge						
bottled beer fridge						
wine fridge						
other						
DINING AREA						
heating						
air conditioning						
food warmers						
other						
GENERAL						
water heater	1		X		X	
other						

7. Have any of the following lighting retrofit measures been implemented in your establishment?

measure	Implemented	not Implemented
replace 40W fluorescent lamps 34 W lamps		X
replace fluorescent lamps and ballasts with T8 lamps and electronic ballasts		
replace incandescent lamps with compact fluorescent		X
replace incandescent lamps with quartz halogen		X
retrofit exit signs with low energy type	X	
install high intensity discharge outdoor lighting		
other		

8. Have any of the following energy conservation activities been undertaken at your establishment?

energy conservation measures	already completed	planned for next year	not completed
KITCHEN AREA			
install low energy dishwasher			
install heat recovery/exchange units			
— kitchen exhaust			
— grey water			
— other			
rebalance kitchen exhaust/makeup air			
regular maintenance of refrigeration units (twice/year min.)			
other			
DINING AREA			
recommission rooftop HVAC controls			
regular maintenance of rooftop HVAC systems (at least twice/year)			
other			
GENERAL			
install programmable thermostats for unoccupied setback			
install high efficiency water heater			
insulate hot water tank and pipes			
weatherize windows and doors			
retrofit windows with sealed double glazed low-E			
increase roof insulation			
other	X		

9. Other Comments:

Site uses no gas. Refrigerators are large commercial package units. Most baking is done on site, some off site.

WATER

Water use is minimal. Approximately 25% of food and coffee served in china, balance in disposable containers. All dishwashing is done by hand.

WASTE

Does not pay for waste management. Shares recycling and waste bins with other building tenants (offices and apartments on upper floors).

Recycles cardboard used to deliver supplies.

Minimal opportunities for cost savings and waste reduction.

APPENDIX D

FOOD SERVICE SECTOR RESOURCE CONSERVATION SURVEY QUESTIONNAIRE

SURVEY RESOURCE CONSERVATION IN THE FOOD SERVICE SECTOR

Background

Name of Company _____

Name of Contact Person _____

Title _____

Phone # _____ Fax # _____

Company Information

Line of business

full service ☐
night club/bar ☐
quick service expanded menu ☐
cafeteria ☐
take out/home delivery ☐

Hours of operation

Monday to Thursday ☐
Friday to Saturday ☐
Sunday ☐
weekly average ☐

full time staff (1996) _____

part time staff (1996) _____

floor area _____ square feet

annual gross \$ sales (1996) _____

Resource Conservation Initiatives

1. Is energy, water or waste disposal a significant operating cost to your business?

	yes	no	don't know
energy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
water/sewage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
waste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. Has your business made any efforts to identify areas where these costs could be reduced?

	yes	no	don't know
energy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
water/sewage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
waste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If no, what problems have you encountered?

	major problem	minor problem	no problem
no time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
no budget	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
no management support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
inadequate information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
don't know where to start	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
considered to be a low priority	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
need access to information and contacts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. If you want to reduce your energy, water and/or waste costs which areas are of greatest concern to you?

	major concern	minor concern	no concern
energy costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
water/sewage costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
waste costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Has your establishment invested in energy or water conservation initiatives?

	Water	Energy
total \$ investment last year (1996)		
total \$ investment last 5 years		
expected \$ savings (annually)		
pay back period (months or years - please circle)		

5. Do you know what you paid for the following services in 1996?

	Yes	No	Total Bill (\$)	Total Units Used
Electricity				_____ kW
Gas				
• oil				_____ gallons
• natural gas				_____ m ³
Water				_____ m ³ , ft ³ , gallons (please circle)
Sewage				_____ m ³ , ft ³ , gallons (please circle)
Garbage				_____ kg, tonnes (please circle)
Recycling				_____ kg, tonnes (please circle)
Other				_____ units (please indicate)

Can you provide any bills from 1996?

Energy Utilization & Conservation

6. Please check (✓) the type of energy used for various pieces of equipment at your establishment and the approximate proportion of the total energy consumed in each area by each device listed.

Equipment	No. of Units	Type of Energy Used		Estimated Proportion of Energy Consumed		
		Gas	Electric	High	Med	Low
KITCHEN						
broiler						
grill						
deep fryer						
oven						
toaster						
dishwasher						
standard fridge						
standard freezer						
walk-in fridge						
walk in freezer						
exhaust/ventilation						
other						
BAR						
ice machine						
draft beer fridge						
bottled beer fridge						
wine fridge						
other						
DINING AREA						
heating						
air conditioning						
food warmers						
other						
GENERAL						
water heater						
other						
other						

7. Have any of the following lighting retrofits measures been implemented in your establishment?

Measure	Implemented	Not Implemented
replace 40W fluorescent lamps with 34W lamps	<input type="checkbox"/>	<input type="checkbox"/>
replace fluorescent lamps and ballasts with T8 lamps and electronic ballasts	<input type="checkbox"/>	<input type="checkbox"/>
replace incandescent lamps with compact fluorescent	<input type="checkbox"/>	<input type="checkbox"/>
replace incandescent with quartz halogen	<input type="checkbox"/>	<input type="checkbox"/>
retrofit exit signs with low energy type	<input type="checkbox"/>	<input type="checkbox"/>
install high intensity discharge outdoor lighting	<input type="checkbox"/>	<input type="checkbox"/>
other	<input type="checkbox"/>	<input type="checkbox"/>

8. Have any of the following energy conservation activities been undertaken at your establishment?

Energy Conservation Measures	Already Completed	Planned for Next Year	Not Completed
KITCHEN AREA			
install low energy dishwasher			
install heat recovery/exchange units:			
- kitchen exhaust			
- grey water			
- other			
rebalance kitchen exhaust/makeup air			
regular maintenance of refrigeration units (twice/year min.)			
other			
DINING AREA			
recommission rooftop HVAC controls			
regular maintenance of rooftop HVAC systems (twice/year min.)			
other			
GENERAL			
install programmable thermostats to reduce unoccupied space temperature			
install high efficiency water heater			
insulate hot water tank and pipes			
weatherize windows and doors			
retrofit windows with sealed double glazed low-E glazing units			
increase roof insulation			
other			

Water Utilization and Conservation

9. How are you billed for water and sewage services? Please check one for each:

	Water	Sewage
Flat rate	<input type="checkbox"/>	<input type="checkbox"/>
Included in taxes	<input type="checkbox"/>	<input type="checkbox"/>
Part of rent/lease agreement	<input type="checkbox"/>	<input type="checkbox"/>
Metered use	<input type="checkbox"/>	<input type="checkbox"/>

10. What type of water-using equipment do you have at your establishment?

Water Utilization	Yes	No	Don't Know
Water Cooled			
- refrigerators			
- freezers			
- ice machines			
- air conditioning			
Automatic dishwashers			
- conveyor type			
- batch type			
Garbage Disposers			

11. Please check (✓) how water is used in the various areas at your establishment.

Water Utilization	Yes	No	Don't Know
Food Preparation Sinks			
– faucets run continuous			
– faucets are turned off and on as required			
Thawing of Food			
– immerse in water			
– let water flow continuously over frozen food			
– microwave			
– other			
landscaping			
decorative fountains			
other			
other			

12. Have any of the following water conservation activities been undertaken at your establishment?

Water Conservation Measures	Already Completed	Planned for Next Year	Not Completed
install water flow restrictors			
install aerators in sinks			
automatic water on-off controls			
pressure heads on dishwasher hose			
retrofit toilets with devices such as toilet dams, early closing flappers, etc			
install low flush toilets			
repair pipes & leaks			
replace seals			
replace separate hot & cold taps with mixed water taps			
replace once-through cooling systems with closed-loop type cooling systems for:			
– refrigerators			
– freezers			
– heating and air conditioning			
– ice machines			
reuse waste water (i.e. reuse of final rinse water in dishwasher)			
install low flow dishwashers			

Waste Diversion

13. Please (✓) which method is used for storing and collecting garbage?

System of Garbage Collection

	Municipal	Private	Other
street collection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
cart collection (i.e. 90 gallon)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
front-end loader (i.e. 2, 4 or 6 yd ³)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
compactor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14. How often is your garbage collected?

- | | | | |
|---------------|--------------------------|-----------------|--------------------------|
| daily | <input type="checkbox"/> | twice a week | <input type="checkbox"/> |
| once a week | <input type="checkbox"/> | every two weeks | <input type="checkbox"/> |
| on call basis | <input type="checkbox"/> | other | <input type="checkbox"/> |

15. How often is the bin full when collected?

- | | |
|------------------|--------------------------|
| all the time | <input type="checkbox"/> |
| most of the time | <input type="checkbox"/> |
| half of the time | <input type="checkbox"/> |
| rarely | <input type="checkbox"/> |

16. How are you charged for garbage?
(you may check more than one)

- | | |
|---------------------|--------------------------|
| municipal taxes | <input type="checkbox"/> |
| flat monthly fee | <input type="checkbox"/> |
| based on weight | <input type="checkbox"/> |
| based on volume | <input type="checkbox"/> |
| flat rate/pick-up | <input type="checkbox"/> |
| transport + tip fee | <input type="checkbox"/> |
| flat rate | <input type="checkbox"/> |

17. Please check (✓) which method is used for storing and collecting recyclables?

Recyclables Collection System

- | | Municipal | Private | Other |
|---|--------------------------|--------------------------|--------------------------|
| blue box collection | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| cart collection (i.e. 90 gallon) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| front end loaders (i.e. 2, 4 or 6 yd ³) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| bailer | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

18. Please check (✓) how often recyclable materials are recycled at your establishment?

Recyclable Materials	Frequently	Sometimes	Rarely	Never
corrugated boxes				
boxboard				
office paper				
newspaper				
glass containers				
aluminum cans				
steel cans				
PET plastic bottles				
HDPE plastics				
polystyrene				
food scraps				
grease				
pallets				
other				

19. Have any of the following waste diversion activities been undertaken at your establishment?

Waste Diversion Measures	Already Completed	Planned for Next Year	Not Completed
implement a recycling program			
reduce size/weight of take out packaging			
use permanent utensils instead of disposable			
use reusable caps, aprons and towels			
use cloth napkins			
serve condiments in bulk			
buy supplies in bulk			
have suppliers take back transport packaging			
have supplies shipped in reusable crates/boxes			
send edible food to food banks			
send food scraps to farmers			
compost food scraps			
other			

20. How would like to receive more information on resource conservation?

- phone-in hotline ☐
- access to information on the Internet ☐
- half day workshop ☐
- on-site visits ☐
- case studies and contacts ☐
- cost/benefit information ☐
- list of available technologies ☐
- simple initiatives to implement ☐
- enhanced conservation initiatives ☐
- information provided through the Association ☐

21. What payback period do you think is required by your company to invest in resource conservation equipment or approaches?

In years _____ years

22. What are the primary support tools that would encourage you to implement resource conservation? Please indicate importance to your operations.

- | | High | Medium | Low |
|-------------------------|--------------------------|--------------------------|--------------------------|
| technical support | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| attractive financing | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| information on products | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| contractor selection | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| utility guarantees | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

23. Have you been approached by a utility or equipment supplier offering a special package deal as an incentive to switch to more efficient equipment?

yes ☐

no ☐

don't know ☐

If yes, who approached you ? _____

If no, are you aware of any package arrangements? No ☐

Yes ☐ who? _____

24. Any other comments?

Thank you
for your time and cooperation

For further information contact Janet Robins
at

Resource Integration Systems

Phone: (416) 480-2420 ext. 106 Fax: (416) 480-2419

